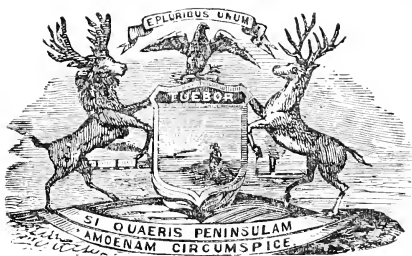


SEVENTH ANNUAL REPORT
OF THE
S E C R E T A R Y
OF THE
STATE POMOLOGICAL SOCIETY
OF
MICHIGAN.

1877.



BY AUTHORITY.

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1878.

REPORT OF THE SECRETARY
OF THE
MICHIGAN STATE POMOLOGICAL SOCIETY.

LANSING, December 31, 1877.

TO CHARLES M. CROSWELL, *Governor of the State of Michigan:*

I have the honor to submit herewith, in compliance with legal requisition the accompanying Report for 1877, with supplementary papers.

Respectfully yours,

CHAS. W. GARFIELD,
Secretary of the Michigan State Pomological Society.

TABLE OF CONTENTS.

	PAGE.
OFFICERS OF THE STATE POMOLOGICAL SOCIETY,	vii
MEMBERS OF THE STATE BOARD OF AGRICULTURE,	viii
OFFICERS OF THE STATE AGRICULTURAL SOCIETY,	ix
PROCEEDINGS OF THE WINTER MEETING AT PONTIAC,	1
PROCEEDINGS OF THE JUNE MEETING AT SOUTH HAVEN,	76
THE AMERICAN GRAPE MILDEW,	134
GROWING PEACHES FOR MARKET,	144
THE CHEMISTRY OF FRUIT RIPENING,	149
VALUE OF THE TRAINING GIVEN AT THE MICHIGAN AGRICULTURAL COLLEGE,	160
TRANSPLANTATION FOR THE FARM, THE ORCHARD, AND THE GARDEN,	168
POMOLOGY AT THE STATE FAIR OF 1877,	177
PROCEEDINGS OF THE DECEMBER MEETING AT GRAND RAPIDS,	200
REPORTS OF LOCAL SOCIETIES,	329
SECRETARY'S PORTFOLIO,	367

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WINTER MEETING,

HELD AT PONTIAC, FEBRUARY 6TH, 1877.

The winter meeting of the State Pomological Society opened in Clinton Hall, Pontiac, on Monday at 2 P. M. The show of apples was especially fine, nearly 400 plates being in place upon the shelves. The hall was filled up with shelving on the sides and in front of the stage. The show in flowers was somewhat deficient, only a few primulas being on exhibition.

Prof. W. J. Beal, of the Agricultural College, called the meeting to order, and the Secretary read the following letters:

E. J. Shirtz wrote from Oceana county that there was a fine prospect for fruit, and at the State Fair for 1877 Oceana county would show peaches and plums that other sections would do more than well to excel. J. Austin Scott of Ann Arbor J. W. Humphrey of Plymouth, Prof. Holmes of Detroit, and Judge Ramsdell of Traverse, all regretted their inability to attend the meeting.

The following is an extract from a letter written by S. B. Peck, of Muskegon:

As to the city and township of Muskegon we can say very little that is encouraging on the subject of pomology. Our best fruit lands being on the bluffs of Lake Michigan are yet as the timber thieves left them long years ago, without cultivation or settlement, while the fruit trees which have been planted on the more level lands in the settled parts were swept off by cold blasts of 1873-4, leaving only a few apples, the fruit of which is destroyed by the progeny of the codling moth, a few plums for the curenlio, and cherries for the birds.

Were I some forty years less than seventy-two of age, I would make a mark upon this shore that would show up the capabilities of this region, but my age and infirmities warn me that I had better let the cremation of my one thousand fruit trees of the past season wind up my pomological career. I still feel an interest in pomology, in the prosperity of our society, am proud of our State and of its standing in the pomological world, and sincerely pray for its prosperity and success, but cannot promise to attend many more meetings unless near home.

Truly yours,

S. B. PECK.

M. B. Williams of Saugatuck, wrote as follows:

"I fear your Society will discover it has not selected the best man to represent its interests in Allegan county. While I realize the advantages to Michigan fruit growers of having in our midst such a live association as the State Pomological Society, yet I have never been able to find myself quite so enthu-

siastic over this subject of fruit growing as many seem to be. Indeed I have sometimes thought it quite possible to give the business more pulling, and 'bugle-blowing' than it would stand, and that facts even might be stated in such a way as to give the 'uninitiated' entirely too high an opinion of the beauties and profits of the occupation, and perhaps any facts or statements which I would give might appear a little tame by the side of some rather more highly colored pictures drawn by other pens. Would be glad to meet with the Society at Pontiac in February, but don't think I shall be able to. Our fruit prospect in this locality thus far is good. Buds appear to be uninjured. Three degrees below zero is the coldest we have had this winter, and that only for a short time. Have had a great deal of snow, which commenced falling before the ground was frozen much, so the roots have been well protected. For several days past it has been thawing considerably, with some rain, which has taken off much of the snow. It is hard telling what kind of weather we may have next, but if it continues favorable, and fruit buds remain uninjured until spring, there will be a great many trees set out in this vicinity, as the good yield of last year, and the remunerative prices obtained, especially for peaches, have set very many to thinking about setting out more of that, as well as of other kinds of fruit."

The following letter was also read from Little Prairie Ronde, Cass county :

Charles W. Garfield, Secretary :

DEAR SIR,—Your letter informing me of my appointment as Vice President is at hand. I accept the position and will endeavor to perform the duties to the best of my ability. I shall not be able to attend the meeting in Pontiac, and send this in my place. We have thus far had an unusual winter: steady, cold weather and deep snows all through the month of December, and, with one or two days excepted, the same for January. For the past six weeks the snow has averaged more than two feet in depth, although it has been constantly settling, the waste being made good with almost daily additions. The mercury has ranged from 10° above to 6° below zero, with no extremes. What the effect may be on our fruit trees can better be told after a few days warmer weather.

Although our county borders on the great fruit county of the State, Van Buren, there are very few men in it that take much interest in the development of its fruit capabilities. The apple is about the only fruit tree that can be relied on for profitable cultivation generally throughout our county, and that was subjected to fearful ravages by the cold winters of the past few years. Our peach trees are gone, except a few sickly remnants on high points. The pear trees are fast following the peach; they flourish well for a few years, but soon after commencing to bear, are killed by blight. All locations, and kinds of culture, and varieties, seem to fare alike. I do not know of a good, thrifty pear orchard in which the trees have generally stood well for ten years in our county; still we have isolated cases where trees have flourished and borne good crops of fine fruit year after year for a score or more of years.

I will not let this opportunity pass without saying a good word for the Early Richmond cherry. It proves a success with us, and is the only cherry among a dozen varieties worth propagating.

With the best wishes for the success of our society, I remain,

Yours truly,

B. G. BUEL.

W. W. Tracy, Old Mission, Grand Traverse county, wrote :

"I am ashamed that I have not responded to your invitation with a paper, but time has slipped by without it. Were I in attendance at your meeting I should try to bring out a discussion on the subject of 'Black heart in apple trees.' Gray says in his *Botany*, page 154: 'The living parts of the tree are only these: first, the rootlets at one extremity; second, the buds and leaves of the season at the other; and, third, a zone of the newest wood and the newest bark connecting the rootlets and the buds and leaves, however widely separated these may be,—in the largest trees from two to four hundred feet apart. And these parts of the tree are renewed every year. No wonder, therefore, that trees may live so long since they annually reproduce everything that is essential to their life and growth.' Now a tree is doing well; we have a very hard winter which at first seems to have killed the tree, we let it stand and it throws out branches which grow vigorously under the good culture we give it. The next spring if we cut off the tree at the trunk we find a 'zone of the newest wood and newest bark' apparently perfectly *healthy*, but the inside of the tree black or rotten with dry rot, and our experienced nurserymen and orchardists tell us the tree is useless, it is black-hearted. If we let the tree stand we shall find that the proportionate amount of the new live wood is increased, but that this black heart grows with the tree. Now it seems to me if Mr. Gray is right this black heart can be of *no injury* to the tree (except by depriving it of so much support against wind), unless it is the symptom or an attendant condition of some disease. If it is so, what is it? If the time is not fully occupied I should be glad to have the matter brought up. So far as I can observe, this black heart, whether the result of a hard winter or of bad culture, is the same.

"I send a few apples, a plate each of Baldwin, R. I. Greening, Wagener, E. Spitzenburg, Red Canada, Talman Sweet, G. Russet, Dumelow, and Autumn Strawberry.

"The Dumelow was received by that name from Wisconsin, and is certainly a very fine cooking apple, being very tart and cooking tender without losing its form. Autumn Strawberry is called by that name here. These with the Wagener and Baldwin, came from a neighbor, the rest from my cellar, and I now am sorry that I sent them, as they hardly do us justice as compared with the careful selections we might have made. Forty per cent of our Greenings were as good as those sent, and the Red Canadas and Spys were taken from our eating apples in the cellar, so we have not moved every stone to get the best, as we should do for such an occasion."

BLACK HEARTED TREES.

A short discussion ensued on the above topic by Prof. W. J. Beal, N. Chilson, of Battle Creek; H. Dale Adams, of Galesburg; E. H. Reynolds, of Monroe; Mr. Carpenter, of Orion; A. G. Gulley, of South Haven; B. G. Stout, of Pontiac—pro and con in favor of cultivating and not throwing away trees which are frozen when one and two years old. Mr. Stout stated that he set out an orchard of 1,000 trees which were frozen the first winter, and he thought that he had lost the whole, but an examination of the roots determined him to try them for a year or two. They were set in 1863, and last season he picked 800 barrels of prime fruit. Mr. Carpenter stated that in his section they favored eastern trees rather than western. Mr. Adams stated that during a visit to Western New York, he saw as many frozen trees in the nurseries as in this State. Mr. Gulley and Mr. Stout stated the same.

Prof. Beal said that most of those affected trees could be told from their appearance by experienced fruit growers. Many of the affected trees would of course fail to do well. Such as did continue to grow would in a measure overcome the injury; although the heart did show black, it was only a damage so far as it weakened the strength of the tree.

Mr. Chilson did not believe such trees were as good as those not affected. Had cut back some after the severe winter of some years ago.

Mr. H. Dale Adams said that what was true in regard to nursery trees must be somewhat so in the orchard, and that trees so affected by the frost must be a failure.

Mr. Reynolds, of Monroe, said his experience was that all trees had been found to be affected on cutting in, and that they did not suffer much, many of the trees in the nursery overcoming it entirely if not transplanted too soon. He would not recommend setting such trees in an orchard, though some of them might do well.

The discussion that followed showed that the general belief of the orchardists present was that the black heart was not confined to western nurseries, but that eastern trees were also affected as badly as ours from the severe winter of 1874, and the general belief seemed to be that if the injured trees were allowed to remain in place and the following season was not too dry in the locality, they would entirely overcome the injury.

H. D. Adams made a report as delegate to the N. Y. Horticultural Society, giving a synopsis of the questions discussed at their Society, and reports upon different fruits raised in Western New York, which was very full and able, and extracts of which will be found in the Secretary's Portfolio of the present volume.

The chair here announced the usual committees, as follows:

On Nomenclature of Apples—Messrs. C. N. Merriman, of Grand Rapids; N. Chilson, of Battle Creek; and Wm. Rowe, of Grand Rapids.

On Apples—Prof. W. J. Beal, of the Agricultural College; Byron G. Stont, of Pontiac; and E. H. Reynolds, of Monroe.

On all other Articles—Prof. C. L. Whitney, of Muskegon; A. G. Galle, of South Haven; and W. Caldwell, of Commerce.

On Resolutions—Wm. L. Webber, of East Saginaw; H. Dale Adams, of Galesburg; and S. B. Mann, of Adrian.

Mr. C. N. Merriman, President of the Grand River Valley Horticultural Society, then gave an address on

HELPS, HURTS, AND HINDRANCES TO THE POMOLOGY OF MICHIGAN.

In treating briefly to-day of helps, hurts, and hindrances to Michigan pomology, we can but touch upon some of the principal obstacles and enemies to be met in fruit growing, with suggestions upon practical remedies, hoping to draw out the ripper experience of our best growers upon all practical points on these subjects during the discussions of this meeting. We will consider partially the advantages and disadvantages of our climate, frosts, winds, winters, insects, railroads and various aids toward productiveness and general efficiency in the pomological aims of our State.

Some of us have been too easily discouraged by the exceptional severity of an occasional winter that causes damage and loss in trees in some instances and

certain soils. I wish to ask what favored country on our broad smiling earth has escaped similar or more severe visitations of a sometime frigidity. Not the "dear sunny climes" of Italy, Spain, nor fair, favored France, nor yet our Florida, famed in Flora's realms, nor the far Faderlands of Germany. Not while we read of an ice-bound Rhine and Seine; ice-bridges in the lower Mississippi, and Florida's frozen figs, oranges and bananas, frost-blighted acacias and magnolias. These are no rare occurrences in those and other most favored climes; and we may endure our severest winters as we do sickness and losses in our own ranks, thankful for past immunities, and hopeful of and for future success through our brightening prospects, in the ranks of our fair queen Pomona, in her most loyal province of Michigan.

Now our most efficient remedy for hurts and hindrances of this ilk is, plant profusely. Plant again, set and reset, plant trees, plant vines! Like the electioneering creed on voting—plant early and often. Neither an occasional failure in crops nor loss of trees and vines, can controvert the fact, now so well demonstrated, that Michigan is a pomological State, and hard to beat in her line. Farmers must encounter seasons of drouth and of wet, yet they cling to corn, clover and wheat, wool, pork and stock.

Just here we will refer to loss and injury from early and late frosts. In this regard we would reiterate what our society has so often urged before, viz.: the importance of your highest locations in fruit planting. Many have been diverted from this initial point vainly looking for protection, in shelter, in warm exposure, in timber belts, and the like, while atmospheric drainage is the protection required as indicated by the simple fact that we find the mercury showing a temperature several degrees lower in the valleys than upon the hill tops. We sometimes, however, see nature providing a preventive, or remedy against the disadvantages of the low lands, in clothing them in impenetrable fogs and night vapors. Light frosts have no injurious effects where vegetation remains long enough encased in this frost proof armor of humidity. But in these lowlands it is hazardous trusting to their remaining immured in these fickle vestures of surrounding moisture and vapors, for they are very liable to vanish with the dawn, and old Sol to beam forth with undimmed splendors on the doomed and frosted valleys.

When unfortunately our plants have been frosted we hasten to relieve them by a sprinkling of water, and a thorough moistening before the sun or dry atmosphere shall strike them. Now if agricultural chemistry or science will furnish us a material or method by means of which the blossoms and embryo fruit may be artificially clad in their vestures of moisture, then we have an additional protection against the ravages of Jack Frost. The most efficient agent for this purpose within our knowledge is land plaster, or common gypsum. This cheap and abundant article, within the reach of all, seems to draw the moisture to the plant or the embryo fruit, and also to so concentrate the ammonia and gases from the passing vapors, as to feed, protect and strengthen the germ and young fruits, and to tide them over some of the vicissitudes of their early stages, such as frosts, not too severe, and our cold drying easterly winds, or other blighting winds that have sometimes blasted whole crops. Those who have tried it told me they had saved their crops of stone fruits by the use of this convenient remedy or preventive. Their manner of applying was by repeatedly sowing it over leaves and blossoms of all trees through the season of blooming and fruit setting, while damp with morning dews or rain. It can't be applied too often over our orchards as above. It has been attended

with invariably favorable results we believe, whether the test were upon seed or stone fruits.

If any ask a full explanation of the phenomena of these mysterious operations of gypsum upon vegetation and production, we would recommend them to a study of the subject by actual experiment, simply promising that this agent of fertility and general productiveness is one of the helps that Michigan places at the door of every grower who will avail himself of its virtues.

INSECTS.

We come now to consider our insect foes. We have them in common with the rest of the world, their name is legion, one of the most destructive of which is the inveterate codling moth. But, my friends, as to its power to ruin and destroy our entire apple crop, despite our best efforts, we say, give way to no fears and misgivings of any such gloomy result. Nor need any but the lazy man give up to utter loss his plum crop to that deadly desperado, the plum curealio; but take heart of grace and fight these little fiends, both of them, by all the known methods and appliances, by bands of cloth, matting or other material round the trees, examining often and killing their tenants. You will sometimes find the moth worm by the hundred at a time under a single band left too long unattended. Set the birds to fighting them by the paper bands around the trees, through which the birds can and do with unerring instinct, strike and extract our hated pest, their loved titbit. Have your hogs fight them too, running in the orchard constantly during the season, devouring insects and imperfect fruit. Fight them by scraping off all loose, rough bark and moss and washing with lye or other washes, which destroy the eggs and larvæ. Fight them by cremation, equally or more effective for the purpose, passing lighted torches of flame along trunk and limbs, flashing over the bark, it is harmless to the tree, but death to the vermin and their hateful progeny: fight them, we say by all means known for the extermination of the pests, but never give in to them. An easy method with the plum trees is a coop of young chicks under each; and it is well known that in the pig and chicken yards plums are grown without difficulty.

We Wolverines are apt to think that New York State is the paradise of orchardists, and, per contra, Yorkers think it located in Michigan. A farmer said to me the other day: "They don't have the codling moth in York State; they don't have wormy apples, either." If this be true it is because they have had their day there, and run out, and may Heaven grant that they may do the same here. May we not conclude that the only serious hindrance to the greatest growth and most triumphant prosperity in Michigan pomology would be the laxity or laziness of the growers of fruits. Their successes have been perhaps too easy. Our grower often has such enormous crops of fruit that he gives up in despair of being able to take care of it all, and follow out the best methods and rules towards his greatest attainable degree of perfection.

Finally we have cheap and ample transportation for fruits by water and rail, and we have at last gained the substantial sympathy and co-operation of our railroads; with, perhaps, one or two exceptions, very soon there shall not be one exception, but all meet us half-way and willingly grant all courtesies, to which our societies are entitled by their gratuitous labors for the great industries.

The next thing on the programme was a discussion on the topic

FRUIT AS A PART OF GOOD LIVING.

Mr. Garfield.—The subject assumes no inconsiderable importance when we have such an enormous crop of fruit as was our fortune the past season. The demand lies with the consumers, and if they believe that fruit is an essential to a thoroughly good living, and that it is the most healthy material upon which to make a diet, the methods for using it in variety will increase, and the aggregate amount used will be augmented, thus using up the products of the orchards to good advantage. Even among people who raise an abundance of good fruit it is not employed as a part of the family living, as I should think it would be.

Ripe fruit for dessert is infinitely more palatable and healthy than pastry, and still how few tables have it in abundance! I am strongly in favor of adding more fresh fruit to our table diet. If put in the place of rich pastry a large amount of dyspepsia would disappear as if by magic.

Prof. Beal.—I most heartily concur in that which has been said, and would add that if apples are dried by the new process, now so common, they are nearly as good as green ones, and there is no reason why this dried fruit cannot be made, in years of great plenty, very cheaply, so that all can enjoy the pleasure of using what comes very nearly to green fruit.

Mr. Merriman.—I often wonder why there is not more progress in methods of keeping grapes. They are so universally enjoyed in their fresh state, and make so delicate a table dessert, that they should not be confined to a few weeks, but should grace the table for months. I believe this can be done; in truth I have myself kept grapes through the winter in beautiful condition. When this is generally accomplished we shall not need to resort to wine for the juice of the grape, and we shall have no danger of over-stocking the market.

Mr. Stout.—I do not yet believe we have reached perfection in the making of apple sauce, and it is quite desirable that there be progress made in this direction. Preserves made richly are not fit to eat, and we ought to put in their place a healthful sauce that can be made by any one, and I am free to say that my method for making a genuine article of apple sauce has yet to find a superior, either in simplicity or perfection. It is simply to cook the apples slowly for a long time, thus preserving the form of the pieces, and giving a richness of color and flavor obtained in no other way. I am satisfied that if all who love apple sauce will try this method they will never abandon it, and thus we are furnished with a key to one method of answering the question of what shall we do with our apples.

Mr. Southard.—I am convinced that we eat too much meat, and too little fruit. I have always had good health, and feel indebted for it largely to the fact that long ago I decided to substitute in my living apples for hog.

President Lyon then delivered his

INAUGURAL ADDRESS.

Entering, as we do, upon the preparations for the labor of another year, we may very properly turn our attention for a few moments to a retrospect of our operations during the one just now expired, with the hope that, out of its varied experiences, we may be able to draw some deductions that shall point to possible improvements for the future.

Looking over the ground at the opening of last year's operations, and considering how largely the centennial year, and the claims of the gigantic

exposition at Philadelphia, covering the entire active season, with the work imposed upon our society by our State Centennial Commission, must tax the wholly voluntary energies of our members, it was judged expedient to forego, for the year, the offering of premiums for orchards and gardens, and to substitute for the usual orchard committee a corps of fruit collectors, operating under the auspices of the State Centennial Commission, in part at least, in the gathering, transmission to Philadelphia and exhibition there, of collections of fruits, such as should adequately indicate to the world the real capacity of our State for the pursuit of this specialty.

That our society has been able to achieve a reasonable degree of success in this undertaking, is, we trust, very generally admitted; although the true measure of that success can hardly be fully understood, until the publication of the reports proper, of the group of judges specially in charge of the pomological exhibits. We will only state that, in a private letter, written since the close of the exhibition, one of the judges of this group, who has, throughout, participated in the weekly examinations of fruits, and in the recommendations of awards, remarks that the display of Michigan fruits, as a whole, was at least equal to that of any other State.

So far as the May exhibit of fruits, the growth of 1875, is concerned, there seems to have been little attempt to compete with us: and hence the Michigan collection, by universal assent, stands out prominently as the characteristic feature of the entire display of that season.

So many serious obstacles were found to exist, militating against the prospect of success, in any attempt to compete with localities more immediately adjacent to the exposition, in the display of the earlier and more perishable small fruits, prominent among which were their perishable character, the warmth of the weather when they would be in season, the expense of the packing requisite to provide against inevitable rough handling, as well as the exorbitant charges, and other vexatious exactions of the express companies, to which the packages must be entrusted, that, after careful consideration, it was decided to omit all attempt at a general display of these classes of fruits: leaving the exhibit to commence with the season of plums and peaches.

The display of plums coming mainly from the extreme north, under the careful packing and judicious management of Judge Ramsdell, of Traverse City, proved highly creditable and satisfactory.

That of peaches, in the efficient hands of H. E. Bidwell, of the "Peach Belt," especially so far as the earlier varieties are concerned, was compelled to encounter more serious difficulties, growing out of larger size of the fruits, exceeding delicacy of texture, perishable character, and the warmth of the season during which they were in condition; to which must be added the impossibility of securing at the same time rapid transmission and careful handling. Notwithstanding these serious obstacles most of these collections came through in very tolerable condition; and, as a whole, the display of this fruit was very creditable.

Grapes came in at a later date; after the greatest heat of the season was past; which permitted shipping them through as fast freight, thus exempting them from the trying ordeal of being hastily tumbled from one express car to another while en route. This exemption, together with careful packing and management, under the practiced hand of Mr. E. Bradfield, of Ada, brought out the display of this fruit in condition to play an important part in filling up the measure of our reputation as a fruit growing State.

Pears, under the supervision of I. E. Ilgenfritz, of Monroe, were out in very considerable force, and among them were some very fine specimens; especially some plates of Bartlett and Flemish Beauty, from the Peninsula in Traverse Bay; which were, in our estimation, the most beautiful specimens of this fruit in the entire exhibition, although others may have excelled them in size.

Apples, of course, constituted the great bulk, and also the overshadowing feature of the entire collection; and the magnitude of the entire exhibit may be better appreciated if we state that Michigan must have placed upon the tables, during the latter part of September and the first half of October nearly or quite three full carloads of apples: exclusive of other fruits. This being the case, we will have little difficulty in understanding that the collector of this fruit, Mr. H. Dale Adams, of Galesburg, must have found the task of its collection, shipment, and arrangement an onerous one.

The grand display of apples had been fixed by the Centennial Commissioners for the second week in September, a date quite too early for the maturity of this fruit in Michigan. For this reason it was decided not to attempt a full exhibit during that week; but to defer the same till the period of maturity; when the size, color and quality could be more perfectly shown; the assurance having been received, that an exhibit then would be accorded the same measure of recognition as if shown at the time specified for the purpose.

In dismissing this subject, we may indulge the remark that, in view of the insufficiency of the Legislative appropriation for the purpose, the work of collecting and forwarding this display of fruits must have lagged, and would possibly have been in the main abandoned but for the active sympathy of the State Centennial Commission, and, in a very direct and effective manner, that of Governor Bagley.

The joint exhibition of this society and the State Agricultural Society, at the recent State Fair at Jackson, occurring during my necessary detention at the Centennial, is understood to have been very satisfactory in its results, and to have added strength to the union of the two societies, as is evinced by the readiness with which arrangements have since been concluded for the continuation of such union in the conducting of the next annual fair, such arrangements having been entered into by the committees of the two societies, upon substantially the same basis as that of last year.

The annual meeting of the society, which occurred at Coldwater, last December, although not largely attended, was by no means lacking in interest; and it is hoped that a good foundation has been laid for the growth of horticultural interests in that fertile and wealthy section of the State.

At the February meeting of the society last year, a resolution was offered by W. L. Webber of East Saginaw, providing that moneys heretofore required to be invested in a life membership fund be placed in the general fund; and used in common with that fund, to meet the expenses of the society. This resolution was referred to the society, to be considered at the annual meeting; but its consideration was, at that meeting, still farther deferred, on account of the absence of Mr. Webber. It is for the society to determine whether or not it shall be acted upon at this meeting.

At the February meeting of last year a committee was raised charged with the duty of applying for and, if practicable, securing rooms in the new capitol, when completed, to be used as the headquarters of the society. Should this committee prove to have been successful in such application, it will doubtless now be time to consider the propriety of taking measures for the collection of a

library: and perhaps also of a museum: and, while on the subject, it would possibly be well to consider also the propriety of entering upon the preparation or collection of a set of artificial fruits in wax, representing at least, the varieties known and valued in our State, with such notes respecting each as shall render them useful to the student of pomology, when the real fruits may be out of season or not readily accessible,

The society has long been, and we earnestly hope it may long continue to be greatly indebted to Prof. Cook, of the Agricultural College, for important and valuable information on entomological subjects: and in view of the increasing importance of this whole matter, not to fruit culturists only, but to agriculturists as well. I suggest the propriety of constituting a standing committee on entomology, with the Professor as its chairman, charged with the duty of collecting facts on the subject and collating them for the use and benefit of the society and the public.

In view also of the wonderful peculiarities of our geographical position, and their influences upon the climate and meteorology of our State; and in consideration of the rapid and reckless destruction of our forests, and its probable influence upon the same, I suggest the appointment also of a standing committee on meteorology, with powers similar to those conferred upon the previous one, and with special reference, in both cases, to the development of the bearings of the information elicited, upon the interests of fruit culture; it being anticipated that the agriculturists of the State will not fail to put in operation adequate arguments for similar purposes bearing more directly upon their interests.

The planting of roadside trees apparently received a wonderful impetus last year from the timely proclamation of Gov. Bagley on that subject. I suggest to the society the consideration of the question, whether it has not also a duty to perform respecting this matter; also, whether it may not very properly memorialize the Legislature in favor of the enactment of a law to provide for the encouragement of persons planting or preserving belts of timber as wind-breaks, in exposed situations, by the exemption of lands so occupied from taxation or by other equivalent provisions.

We may also, very properly, inquire what measures, if any, the society should institute for the encouragement of ornamental planting about our dwellings and grounds; also, as to the most efficient measures to be employed to educate and elevate the taste of such planters, as well as to increase their numbers.

We may also accomplish an important result for a large class of our citizens if we shall be able to devise effective means for protecting them against the impositions of irresponsible and unscrupulous venders of trees and plants.

The American Pomological Society is to hold its biennial session at the city of Baltimore, in September next. Owing to the uncertainty of a full attendance of the members at the June meeting; it will probably be thought best to consider, at this meeting, the propriety of arranging to be represented at such session, by a delegation and also by a collection of fruits.

The South Haven Pomological Society, at its weekly meeting, on January 8th, extended an invitation to this society to hold its next June meeting at that place—assuring us of a cordial reception. Your consideration and acceptance of the invitation is requested.

The process we have thus far employed for the education of the planters of the State, as to the proper selection of varieties of fruits for planting purposes, seems to have been, to a great extent, barren of the hoped for results. This

process (the recommendation of lists of fruits), has been heretofore tried and abandoned, by various other kindred societies; and I, in advance, ask your careful attention to a proposed change in our mode of management in this particular; which proposition is set forth "in extenso" in a paper which I am expected, during the meeting, to present to your consideration.

The President announced the death of Mr. John Gilbert of Ovid, one of the pioneers, and a faithful and earnest worker in the society. Mr. Adams also announced the death of Henry Seymour, of Grand Rapids, and moved to appoint a committee on resolutions of respect. The President appointed Messrs. Beal, Merriman and Chilson.

Adjourned to 7 P. M.

Tuesday Evening.

The evening session was opened by an address spoken by Hon. B. G. Stout, who, in place of the Mayor, welcomed the society to Pontiac. He thought our society ought to know no sectional limits to its endeavors in the State. The work we were accomplishing needed to be done everywhere. The raising of good, wholesome fruit is a matter of great importance to all, and a knowledge of the best methods, the best varieties, and how to market and use the fruit, are questions of equal importance in the east as in the west.

President Lyon responded by saying that the meeting reminded him of his first visit to Oakland county fifty years ago, and then as he saw the beauty of the country with its varied soil and its beautiful lakes, it seemed to him a county of great promise. The years have shown a fulfillment of that promise.

Man is an imitative being, and the beautiful county in its state of nature had begotten a desire to embellish, in those who had settled the country. He was glad to see the development of Oakland county, and would say that our society comes not only upon one mission, but rather a double one. The one to educate and develop an interest in matters of horticulture, and the other to imbibe instruction and enthusiasm from those whose experience is rich and varied. The taper loses nothing in starting the larger light, so we may while giving the initiatory step toward advancement not only not lose anything, but be the gainers thereby. We wish simply to develop the light that is already here, to take off the bushel that the State may see what can be done here. I trust we have not come in vain, and that you will soon be a part of our society, and feel the same work belongs to us all.

The society next listened to an essay on

WINDOW GARDENING.

BY MRS. WM. SATTERLEE, PONTIAC.

In presenting to you a few thoughts upon the subject of window gardening I will endeavor to give some practical hints to those who have had less experience than I in its pleasures as well as its difficulties, in its successes as well as its defects.

For nearly thirty years I have been an enthusiastic window gardener, and I find its delights more than repay the small outlay of time and labor required to render it in a measure successful.

It is not necessary to go to much expense, or to spend a great amount of

time that could be more profitably employed in some other way, to have a few house plants, to adorn our windows and shed their refining influence over our homes. The most they require is an abundance of light, pure air, and a drink of water when thirsty.

A shelf supported by a couple of brackets is very easily arranged, and is more convenient than a table, or even a flower stand, for it not only occupies less room, but does not interfere with sweeping in the least.

Some plants will not thrive without sunlight; few will repay you with blossoms without it, but if you give them a sunny window, and a judicious quantity of water, there are many varieties that will bloom all winter.

Plants are like children. Parents seldom find the dispositions, or even the appetites, of all their children precisely alike; so with plants we must study their wants and give them food according to their several needs.

The heliotrope and fuchsia are gross feeders. The coleus has a brighter color and grows most luxuriantly in a poor and light soil. The calla and eupatorium require a great amount of water, while the hoya or wax plant and cactus thrive best with but little.

The practice of giving plants a little water every day is very injurious, and to some even death. When you water them give a thorough drenching, then wait until they require it again, which you will soon be able to know by the sound of the jar when lightly struck.

It is not only for the beauty, but the health of the plant requires that all dead leaves and faded blossoms be removed as fast as they appear.

I have derived the most benefit from use of fertilizers applied in liquid form, though care should be used in their application.

The insects the window gardener has most to contend with are the scale or bark louse, the aphid or green fly, and more rarely the red spider. Writers upon the red spider say it can be overcome by the fumes of sulphur. I presume they would prove effectual, not only to kill the pests but the plants also. It is much easier to avoid them than to rid the plant of them when once infested, and they will not appear if the air is sufficiently moist.

A decoction of tobacco, not too strong, is excellent to shower roses and heliotropes, and is not relished by the bark louse. Tobacco smoke will kill the green fly. Frequent showerings with clear water is a great preventive to all these pests. I could enlarge upon this subject almost indefinitely, but not wishing to weary you, I will only say "Flowers are ever welcome," and they beautify and shed their fragrance in the humble cottage as well as the stately mansion.

Who that has daily watched the beautiful calla, as it unfolded its bright green leaves, and its pure white calyx, but has been led to look up with reverent and thankful hearts to Him who has bestowed upon us so freely, "Earth's children,"—lovely flowers!

Mr. Rowe.—I think it is a capital idea that the ladies are to take a part in our exercises, and such papers as has just been given us will help us to appreciate our whole field, and I trust we may have more of them. In smoking plants I think Mrs. Satterlee will find it policy to remove her heliotrope as it is quite impatient of smoke.

Mr. Whitney.—The red spider is more frequent than we know; and an insect that can scarcely be seen save by a microscope is a pretty small thing to deal with. I have had as much trouble with it on pot roses as anywhere, and have found a good thorough drenching with whale oil soap suds an excellent remedy.

People make great mistakes in purchasing plants. They buy plants that are in bloom, and the result generally is that after a few blossoms more they are done blooming for the year. It would be far better to select those that had not yet come into flower that they may have the full benefit of them.

Mr. Garfield gave a description of a fern case that he had made for his window, which for a year had been a perfect success with very little care, and no insect depredations. It consisted in a box the length of the window a foot wide and five inches deep, filled with earth and covered with a framework of glass, which kept in the moisture, and everything grew beautifully. To those who could give but little care to plants he recommended this plan.

Mr. Lyon said great care was required in the selection of the right plants for these window cases; that Mr. Garfield had chosen ferns and lycopods, which were eminently fitted for this kind of culture.

Prof. Beal.—I can testify to the success of Mr. Garfield's window garden, and can also testify to numbers of others that have been failures, from just the want of knowledge suggested by Mr. Lyon. It requires some tact and experience to select the right kinds of plants, and have them succeed even in a wardian case.

Mr. Byron G. Stout was the next speaker, who gave an address as follows, upon

THE APPLE CROP—SHALL WE INCREASE IT AND HOW, AND WHAT SHALL WE DO WITH IT?

No fruit in our temperate climate fills a more prominent place than the apple. Other fruits may be more attractive, yet considered well, its uses, its capability of preservation in its natural state, its ability to bear transportation, the apple stands the first of fruits. No wonder that according to tradition Mother Eve was tempted by it, though neither theologians nor pomologists have yet settled the fact whether it was a twenty ounce or a golden pippin.

It is not my purpose to treat my audience as novices in fruit growing, and so follow the apple through all the processes of seed-sowing, grafting, transplanting, pruning and cultivation, but to give a few hints, the result of my own observation, in conjunction with well established theories upon the subject.

To me has been assigned the duty of discussing the apple—"How to increase the product." "How to save it." "How to dispose of it." "Is the crop liable to over-production?" In considering the first question, I shall pass by all consideration of expedients to increase productiveness, such as special stimulants, root-pruning and the like, premising, however, in this connection, that no tree, upon indifferent soil, can thrive without sufficient plant-food. If our soils lack lime, the means of supply are at hand. If they lack vegetable matter and are too hard and compact, there are all through our State deposits of muck which composted with lime and ashes afford abundance of the required element.

It is not enough, then, that we plant a tree, if leaving it unprotected, we find it in a few years, under the action of the southwest wind, pointing, as the sailors would say, "nor' by nor' east," and so exposing the southwest side of the trunk to the action of rays of the sun falling vertically upon it. It is not enough that we prune or graft our trees, if through neglect, we leave suckers to grow at the side of the graft, sapping its life and filling the center of the tree

top with unsightly non-productive branches. We plant trees enough to give every household in the land an ample supply of good fruit, yet, to many, the apple is still a luxury. We say, then, that the *care* of the orchard is the main thing in securing an ample supply of fruit.

First, as contributing to increased production, let us speak of a selection of sites for our orchards. A warm soil and a southern exposure are often selected for this purpose. This no doubt conduces to a rapid growth of wood, yet it frequently renders the crop precarious. In Michigan, protected as we are by surrounding lakes, we rarely lose the crop from frost after blossoming, yet of all locations, conducive to this end, situations protected from the north wind, and open to the sun on the south, are most liable to this calamity. The warm sun in February or March sometimes swells the buds prematurely, and a cold frost following seals their fate. Besides this, the action of the sun upon the trunk of the tree, in such situations, is very marked. The shaded side of the tree in midwinter remains frozen, while the south side is thoroughly thawed. In summer the north side, protected by the tree itself, remains at the minimum temperature, while the south side, under the unobstructed action of the summer sun, experiences a temperature of 120 to 130 degrees.

This unequal action changes the nature of the sap, and blight and gradual destruction of the exposed side follows. This difficulty is aggravated by the trunk leaning to the east or the northeast, and by the folly of some orchardists who persist in training the tops so high that a span of horses seventeen hands high may draw the plow under the tree without touching branches. We think that this liability to blight is increased by training trees with trunks *too long*, thus exposing more body to the sun and depriving the trunk of the shade of the top. Upon sites having a slight inclination to the north, the prematurely warm sun of March, or the heat of midsummer is materially modified, then if pains be taken to secure the erect growth of the tree, or if any inclination of the trunk when small be advised, if it be slightly inclined against the prevailing wind, the sad effect of sunburning upon our orchards may be obviated.

In a setting of over twenty-five hundred apple trees upon my own premises, I have lost none from sun-blight, except in cases where the trunks were long, or so much inclined to the northeast as to carry the top so far over as to afford no shade to the trunk. There are, of course, objections to training trees too low, yet, all things considered, I incline to the opinion that the advantages of low trees are more numerous than the objections. But our orchards are already set; we have followed the common method of high trunks; we have possibly carelessly permitted the trees to lean to the east. What shall we now do to prevent sun-blight? I submit whether wrapping the trunk with tough paper loosely tied would not afford protection till the top shall be large enough to shade the trunk. Possibly the end could be better attained by standing a piece of board against the trunk of the tree on the southwest side, and fastening the top to the tree by a loose string so that the wind will not disturb it. In this or in some similar way hundreds of valuable trees may be saved, and thus the productiveness of our orchards increased. Again, the production of fruit can be increased by avoiding that waste of fruit material, now lost in negligent pruning. I have no desire to make the saw and the pruning knife the chief figures on the coat of arms of the successful orchardist, nor would I have them absent entirely. They both do a good work, but let that also be a timely work. What are the mammoth brushheaps, contiguous to our orchards, but a commentary upon work done, only too late. Why waste the

energy of our trees in the bootless task of woodgrowing, only to be cut out and discarded—would it not be far better to go through our orchards annually, and with an eye to the symmetry of our trees, cut out the surplus wood when a mere twig, rather than wait till it becomes a branch three inches in diameter, the removal of which must impair the vitality of the tree? The pinching of a bud will stop the growth of the incipient limb. A common knife will remove a sprig in a second, that in five years will require the saw, and the paint pot. The good book enjoins, “If thy right hand offend thee, cut it off.” We would, however, suggest to teach our hands good manners and save all occasion for dismemberment. Begin at the beginning with our fruit trees and save the need, as well as the misfortune of too much orchard surgery. The life of the tree is the sap, and thousands of trees perish annually, or receive great injury from the excessive bleeding which even the coat of wax often fails to staunch.

Again, the success of the orchardist depends much upon care of the trees after grafting,—assuming that this work has been well done, all is not accomplished when the cion is set. If the tree is vigorous and the entire top has been grafted, the half of the energies of the tree will be wasted in growing useless sprouts instead of pushing forward the graft, unless the tree be carefully attended to. I have found it necessary to go through my grafts twice a year to rub off a part of the excessive growth upon the body of the tree, so that they would not detract from the growth of the graft itself. In this connection we may make the same suggestions concerning the removal of sprouts that grow from below the point where the tree is trimmed, which if neglected wastes the strength of the tree in growing useless wood.

Before leaving the subject of judicious trimming of trees, I would suggest that care be taken to prevent the prominent upright branches of trees from growing so close together that the outer bark of each branch at the point of intersection comes in contact. Decay in this case is inevitable. The rain passing down the branches saturates the outer bark,—which confined between the branches cannot dry out again, and the loss of a tree is only a matter of time.

I pass by the subject of mulching as contributing to the means of the product of our orchards. I apprehend that the question of irrigation will in the future occupy a more prominent place. The destruction of fruit trees, including the apple, in the winter of 1874-5, was general throughout our State. Large thrifty trees were frozen out bodily. In my observation the Baldwin and Spy suffered the most. In seeking the probable cause we find the autumn of 1874 very dry, and winter set in with the soil as dry as the proverbial ash-bed. So great was the drouth that the snow melting in the spring of 1875, was scarcely sufficient to moisten the earth to the depth of one foot. Below that depth there was so little moisture that the earth upon digging, ran like quicksand. The earth, thus dry and porous, admitted the cold air to the lowest roots. Michigan lost in that winter one hundred thousand apple trees alone. Most of these I think might have been saved had they been thoroughly irrigated before the ground had frozen. I lost one thousand dollars' worth, which, I think, an outlay of two hundred dollars, in a wind-mill, tank, hose, and watering cart, might have saved. The earth thus saturated with water would have afforded protection to the roots and have saved them from destruction.

The benefit of irrigation is not confined to protection of trees in winter. The foliage in dry midsummer indicates clearly the want of sufficient moisture. What many are inclined to attribute to the east wind in way of blasting the incipient fruit, I am led to attribute to cold dry winds in connection with

insufficient moisture in the soil. The tree sending forth its bud and blossom, and comparatively sapless from long winter exposure, must draw upon the roots for more than a common supply. If the roots are short of life blood, it is no wonder that frequently the fruit does not set and the crop is a failure.

At no time in the year is a due moisture of the soil of more importance than at the time of setting of the fruit, and at the beginning of winter—the one I apprehend is essential to the protection of the tree from frost, and the other to its successful fruiting. Thorough mulching may, however, measurably supply the want of sufficient rainfall, by preventing evaporation in summer, and excessive freezing in winter.

I have incidentally spoken of low branches as desirable in the apple tree. When we consider the protection that such afford to the trunk, thus saving the injury of sunblight, I think the considerations in favor of low trees predominate. The limbs should be trained sufficiently high to afford ample circulation of air under the branches, yet so low that one-half the fruit can be picked from a stool on the ground. Strong limbs, brought out four feet from the ground, branching at an angle of forty-five degrees, so as to make an open top for air and sunlight, make in my judgment the best tree.

Let us recapitulate its advantages:

1st. The trunk is shaded so as to avoid sunblight.

2d. The fruit is easily picked.

3d. The wind is less likely to break the tree, or cause the fruit to fall.

4th. The falling fruit is little bruised.

The end of increased productiveness in the apple crop will then be attained by properly caring for the tree, and saving the most of the fruit.

This brings us to the second branch of our subject, "How to save the crop." It is not enough that we have apples in September and October, we want them in May and June. The problem of *saving the fruit* is then an important one. Saving the fruit is not, however, the mere putting it in store. The beginning of the process is back of that. The *picking* is an important part of the work, and the *time of picking more important still*.

The farmer seeks to cut his wheat, oats, and clover at the proper time, thinking that the plumpness of the grain and the superior quality of the hay depends upon consulting the proper time of harvest. The grower of tobacco or sugar cane will engage all the labor at his command to secure their respective crops, not a day too early nor yet a day too late. So much depends upon just the right time in which to do their work, yet many orchardists will pick their apples when all else is done. It matters little with them whether they are picked in September or November so that they are housed before snow flies. The folly of this policy is apparent when we consider that he who picks his apples in September saves one-fourth of the crop, that would be on the ground in October, and one-half that would be windfalls in November, and fit only for the cider press. It is safe to compute that Michigan lost 100,000 barrels in this way in the fall of 1876, half of which would have been merchantable if picked at the proper time. May we not then say that the question of increasing production runs practically into the problem of *saving the fruit when grown*. The Snow apple and the Golden Pippin are quite out of the market in December. Pick them the first of September and they will be sound in February. Pick the Greening at the same time and you will have it fresh in May, slightly shriveled perhaps, but juicy and of good flavor. Pick the same apple the 20th of October and it will be mealy, cracked

and tasteless in April. To make the point practical I will say that on the 10th of September I picked a barrel of English Streaks, headed it loosely, turned it down under the tree, and left it till winter suggested taking it to the cellar.

Six weeks later, I picked a barrel of apples from the same tree equally sound and took them to the cellar with the others. I opened both barrels in January, the last picked had not a peck of sound apples in the barrel, the first had not a peck of bad ones, I have the latter in my cellar to-day. These results speak for themselves.

In my opinion the apple should be picked as soon as fully grown. It should not be ripe. Ripeness and maturity of growth are quite different things. We deem our apples mature at ordinary time of picking, yet they may not be ripe strictly speaking till mid-winter.

I do not purpose to discuss the question of handling or style of package—whether it is best to place in barrels, bins or upon shelves, whether to pack the fruit by itself or with cut straw, sawdust or chaff. This I will say that the *time of picking* has more to do with the preservation of the apple than many are yet willing to concede.

The practice of heading tight barrels as soon as the apples are picked is much to be deprecated. Apples, in common with other fruits, as well as grain, go through a process of sweating, which if not open to the air will cause decay. Two weeks ought to elapse from picking to time of packing. A wide board with three cleats across it to prevent warping and splitting will afford a suitable cover for a dozen barrels standing in a row in the orchard. Putting the fruit in an airy storehouse is, however, better, there the package can be headed at leisure.

The advantage of early picking will be observed in noting the relative effect of decay caused by contact. I speak, of course, of decay from other than the breaking down of the tissues attending over-ripeness—that which is of the nature of a fungus growth. Let any wishing to test the relative facility with which this fungus fastens upon ripe and unripe fruit, try the experiment, and mark the result. Let a bit of skin, upon which this fungus has started, be detached, and be placed in contact with a sound, ripe apple; let a similar piece be placed upon an apple comparatively green, and under favorable conditions such as dampness and warmth, the poison will be communicated to the ripe apple, while the other will for a long time resist the contagion. Or to simplify the experiment, break the skin of a rotten apple, and bring the meat in contact with a ripe late picked apple, and at the same time with one picked early, and mark the facility with which the decay will be communicated to the ripe apple. I claim no originality for this experiment, although I have proved the truth by actual tests.

Aside from judicious picking, there is room for other suggestions as to the treatment of our apples before the time for placing them in our cellars. Inasmuch as it is good policy to handle the fruit as little as possible, many persons deprecate the plan of sorting and repacking fruit before going into winter storage. To this I would myself object if the apples are to be placed in barrels when first picked, but I am speaking now of large orchards where we must depend upon irresponsible labor in picking the fruit, besides it is impossible to pick with expedition, if great care is to be taken in sorting at the time of picking. The fruit should be placed upon the clean sward, in the orchard and then sorted and placed in barrels, by some one sufficiently interested to take proper care,

then taken to the store-house unheaded, or else the fruit should be carried directly to sheds, well carpeted with straw, and left there in bulk to be sorted and packed at convenience. An outlay of five dollars for lumber would suffice for a shed, holding one hundred barrels of fruit. A number of such sheds, placed either as temporary or permanent structures through the orchard, would enable the pickers to carry all the fruit to them without rehandling. The fruit could be packed after the hurry of picking is over. Care, in selecting the fruit, could be better secured, and none but truly choice fruit need then go into winter storage. We would in this way raise the standard of the quality of our fruit, and save our good apples from the damaging effects of proximity with bad ones.

The next branch of our subject is "How to dispose of the fruit," and we may in the same connection discuss the mode of shipping it.

No general rule can be given as to the best time to sell. What might be the advantage of one might prove the disadvantage of the other. If the larger part of our crop should go into the hands of dealers in the fall, those who hold till spring might realize the advance in price, which usually follows putting the control of the market into the hands of middlemen. The best rule for all selling is to do it when a fair price can be obtained. He who sells directly from his orchard saves all the expense of storage, decay of fruit, trouble of sorting and repacking, as well as interest upon the value of his crop. Fruit will bear shipment better when not fully ripe, hence, if it is to be sent to a distant market, the fall is the best time. I look with a good deal of interest to the improvement of the Welland and St. Lawrence canals, now making, and to be completed this year, which is expected to enable large ocean vessels to land at any port of our lakes, thus enabling our orchardists to send fruit direct to Europe without transshipment. Ocean freights are usually high, but when a three bushel barrel of apples can be laid down in Liverpool at one dollar and a quarter per barrel for freight, our fruit growers may expect a new era in orcharding. Apples will always be high in England. England unlike her neighbor France, lives under a peculiar land system. Most French farmers are the owners of their farms. In England the farmers are usually mere tenants. Such have little encouragement to plant trees of any kind, the fruit of which others may enjoy. The result is, the land is sown to annual crops, and large orchards are the exception. This condition of things will make England a good market for our apples, and we only want the era of cheaper ocean freights to solve the problem of success. I leave to the experimenters of cider-making to say what increased value may be given to that product of our apple crop, by concentrating it, by some rapid process of evaporation, or by freezing out much of the water, and so making a partial substitute for wine and brandy in cookery. When the time shall come that America shall imitate the thrift and industry of France, and shall grow the sugar beet at the side of the orchards, and thus make sugar cheap, all of our tables may then afford a rich apple jelly as a relish for our steaks, and save the expense of imported sauces. More than this, when our own cooks shall learn that any good apple slowly cooked several hours in its own juice, will come out red as a cherry, tart, rich and more palatable than the old time apple sauce or apple butter, they will advance more than one step in cookery.

We suggest this, make the most of our apples as an article of food. Consult the most approved mode of serving them up on our tables, and thus successfully dispose of at least a part of the crop.

Is there danger of over-production? We say no. So essential is remunerative pay to prosecution of any calling, that when the time shall come that fruit growing, for a series of years, will not pay, fewer trees will be set, orchards will by many go uncared for,—the apple difficult to reach will be shaken off. The apple will cover the ground rather than shelves in our cellars. The orchard will be let to the coddling moth on shares, the owner to do the work and the moth to divide the crop. Soon the supply will be diminished and those who have gone on surmounting difficulties will reap the reward of their patience.

Heaven has wisely ordained that all success lies through the door of toil. Wherever you find nature producing spontaneously her fruit for human sustenance, there you will find man indolent and degraded. I have no patience with that theology that calls toil an evil and labor a punishment. Toil gives value to everything. Other things being equal, results are valued as labor is the price of enjoyment. What would be the result if the sun and frost would not blight, if all fruit would keep a twelvemonth, if the curculio and the moth would take to feeding upon the soil instead of upon apples? I apprehend that the occupation of our orchardists would be gone. All would have apples to sell, and few would need to buy, and the end would be a neglect as fatal to our fruit trees as are now the enemies against whose depredations we must struggle.

The greatest good is subserved if we make fruit so cheap that all can obtain a reasonable portion, and yet so dear as to afford a fair compensation to the grower. Were it possible that science could improvise a full grown tree in a year, and load it with fruit, that could defy insect enemies as well as frost, heat, and time itself; if we could always reap where we had not sown, if our oil and wine always flowed as from some never failing fountain, no good end would be subserved. Society would go back to its primitive condition of indolence and vice, and man be lacking in that power which alone comes from a struggle with obstacles and which obtains its strength and greatest glory from well earned victory.

The battle, then, if not to the strong, is to the vigilant. When the time shall come that labor and zeal shall outwit the moth and the curculio, we shall not then grow indolent, for Heaven, that kindly sends the discipline of evil, will give us other obstacles to overcome, other foes over which we may triumph.

Prof. Beal.—I have, from considerable observation, decided that the lack of apples some years is due to poor male organs in the flowers. This has come under my notice while crossing apples. Some years it is almost impossible to find pollen to use in crossing, and these are the "off years" with the apple crop.

Prof. Whitney.—I am of the decided impression that oftentimes the entire essential organs of the flowers are so injured as not to be worth anything before the blossoms open, and still there is sufficient vitality to open the flowers. Such years I have perceived the difference in the appearance of trees so injured by the petals looking whiter than usual.

Mr. Merriman.—I believe that often times dry winds at the time the blossoms open blast a full crop of fruit that would otherwise develop. This is what suggested to me the practicability of employing plaster at this season to sprinkle through the trees, and I have found it very efficacious in preserving the fruit while setting.

The Secretary then read an address from Mr. George Parmelee of Grand Traverse, on

PRUNING.

As I cannot be present at the Pontiac meeting I send you a few thoughts on the threadbare subject of pruning, as suggested by experience in the orchard, and without any reference to the wants or possibilities of nursery pruning.

There is a proper distinction between the two kinds, because a young plant bears mutilation better than an old one. A nurseryman may, if occasion requires, take off, at one cut, seven-eighths of a young plant leaving an upright sprout which will rapidly grow to a perfect tree; but if the orchardist takes away, at one cutting, seven-eighths of his bearing tree the balance, as a rule, will be worthless. The large percentage which a nurseryman may remove cannot well be taken as a rule to the orchard; and, though young trees, in the spring of the year, bear well the necessary mutilation of transplanting, it does not follow that the spring is the time when the pruning of the orchard can be most safely done. However, if I speak from experience I must not talk of *nursery* work, for that has not been my school.

I commenced orchard planting with the notions prevalent forty years ago but with no experience, for my father's orchard was planted before I was born. Nobody, then, planted new orchards, and the owners of old ones were repenting that they had ever planted, and, in many cases, were cutting down orchards, believing that the sins of drunkards who loved "hard cider" were charged to their account. I need not say how irreligiously I failed to appreciate a repentance which took so practical a turn; but I had a mental reservation that my orchard should raise dessert apples, cooking apples, drying apples, "sweet cider" apples—anything but "apples of discord."

Experience in orchard raising is a slow school, and, with me, does not get very far in a life time, but I have outgrown a few notions in the simple parts of our work, and taking it for granted that gentlemen of our society intend to raise only the *good* apples, my conscience will not trouble me if I try to help along some of the beginners.

One of the notions of old times was that we must cut off the tap root to throw the growth into the lateral roots so that by getting more heat at the surface the fruit would be of brighter color and better flavor. I followed that rule until, among a few nursery trees of my own raising, I had three trees with great tap-roots and nothing else. The rule would destroy these three and I could not think nature had made such a mistake, and I concluded to let her do what she pleased with those beet-like roots, and the place of the three tap-root trees was noted on my record. The first season's growth was equal to the best, and the trees and fruit, since, have not been inferior to the others. Most forest trees commence life with a clean tap-root and they dispense with it in their own time and thrive without our help.

It is still claimed that the ends of roots, where cut with a spade, should be cut smooth with a knife before planting. I have a number of times, had occasion to move trees that had been planted one and two years, and whose larger roots had been cut smooth, but the smaller, uncut roots had started just as well. Those were trees with fresh roots at time of planting. If roots are exposed, after taking up, so as to become mouldy on the end, I would cut them. I have, now, only one rule about roots: that is, plant all you can get. I used to cover every little cut above ground with a coat of wax or shellac paint as carefully as we could do up a cut finger, but I find no good in it. Cuts, uncovered, heal perfectly, and that is good enough. I will not say that, if cuts are made in spring, covering is not beneficial, I will only say I do not cut in spring.

I propose to discuss this matter of pruning only in reference to the time when to do it and the object or end to be attained.

I thus narrow the subject because of too many demands upon my time and because in respect to those two points there is most injudicious work done.

As to the time to prune I think many persons err in practice when, theoretically, they believe they are not taking the very best season, but they do it in spring because they then have about more or less of orchard work and they like to finish it.

I have cut at all times of the year, and find no worse time than spring, and just that point in the season when buds begin to swell or immediately before. Pruning peach and cherry at that time is especially unfortunate. We wish to see all cuts commence to heal precisely at the point of section, but, if done at that time the bark is apt to die back, more or less, from the cut making a larger scar to heal over. Where shortening in is practiced, it is important to be able to depend upon any particular bud you may want to partially change the direction which some of the leading shoots are taking; but, if done at the time mentioned you cannot rely upon the bud nearest the end. It may take the lead, but it will as often be the second, perhaps the third and, sometimes, even the fourth bud will make the shoot. So the direction the limbs will take becomes a matter of uncertainty; and, it sometimes happens, too, that the end bud makes a faint start, the second one comes a little stronger, while the third will push out vigorously and outstrip the others; which is, of course, unsatisfactory.

There is a better season for this kind of work as well as for larger cutting, and, though I will indicate what I believe is the best time, I shall not undertake to give the physiological reasons why one time is better or worse than another. Because I believe we have not that definite knowledge of the times and ways in which the various organs perform their functions which is necessary to account for the phenomena observed in pruning. I will therefore speak of the results only as the ground for my preference.

A fortnight before midsummer is recommended by one of our best authorities on pomological subjects as being practically the best time for pruning; while another excellent authority claims that pruning should be suspended until the trees have completed their growth by extension and formed the terminal bud at the ends of their shoots. These two authorities hardly refer to the same date because the trees, under ordinary circumstances, do not set their terminal buds a fortnight before midsummer. There is a time in the summer when pruning can be done without apparent injury; that time is not any specific date but depends on the stage of growth of the tree, which is varied by early and late springs, by wet and dry seasons, by cultivation, by manures and by sterility; and it will vary among different trees on the same plot.

The manifestations of a season's growth vary as the season progresses; the activity of sap, the swelling buds, opening leaves and blossoms, the longitudinal growth and multiplication of leaves, the development of wood and blossom buds for the following season and the formation of the cambium layers, which last takes place, mainly, after the longitudinal extension has ceased.

Perhaps a tree pruned at the most favorable summer stage will show as good results as at any other season; but the difficulty of determining just when it should be done is apparent. I have seen unsatisfactory results from summer pruning manifested in two ways; from exudation of sap which sometimes continues through two seasons, and, also, by an apparent unripeness of the cambium layer in the vicinity of the cut, as manifested by winter killing when

heavy summer pruning is followed by a hard winter. The recent hard winters have afforded many illustrations of this fact. Among tender varieties in unfavorable localities the damage has been much more extensive to trees that have been summer pruned. I abandoned spring pruning, wholly, and summer pruning, to a great extent, many years ago and adopted in stead the early winter season—preferring the month of December.

In shortening in peach trees at that season there is almost an entire certainty that the bud nearest the end will take the growth, and in cutting larger limbs, although there is no apparent healing through the so-called dormant season, the bark never dies back from the cut, the wood is always dry and seared, and when, at the proper season, the process of healing commences it covers a surface of clean and sound wood. It is fair to say that this season, too, has its drawbacks. When the weather is very cold the wood is exceedingly rigid, with the thermometer at zero the twigs are almost like steel. At such times they should not be bent, neither should they be bent much when frozen at all. And it is part of the art of December pruning to avoid injuring the limbs while working among them. The ruthless bending which a nurseryman displays in pruning his trees would be very damaging at this season. It is possible to do shortening in safely with the wood hard frozen, but, in such a case, a twig must be supported by the other hand as the knife passes through it. With this precaution scions may be cut in the same rigid condition, but they must not be carried into a warm room.

In all the years since I have adopted this time for pruning I find no objection to it other than what I have mentioned.

This season may have fewer advantages in sections of country far enough south to be liable to have thaws during the month sufficient to make the sap active. But if any man is skeptical as to its advantages in the northerly fruit growing sections, I would like to show him the results of this practice on my own premises. I would not say that summer pruning should not be done at all, as I know it is often done satisfactorily. But what I would say is there is not that certainty about it that belongs to the early winter pruning, owing perhaps to the fact that the work of the growing tree is changing through the whole season, and it is quite probable that the functions of the various organs do not continue precisely the same through any two successive weeks.

With most cultivators the early winter is the season of leisure, and going over a young orchard at that time furnishes the opportunity to pocket for burning the caterpillar eggs and leaf rollers, which are easily seen when in the absence of foliage.

A person raising a young orchard should give each tree a careful looking over each year, and it is for this main pruning that I would recommend the suitable weather in December. A tree like the Northern Spy so liable to throw out water sprouts, when pruned in winter I would, if very thrifty, still prefer to prune in summer before it sets its terminal buds, and not after that event.

In speaking of the object to be attained by pruning I will leave out all the fine things usually said about "pruning for wood" and "pruning for fruit," for neither of them are objects that pertain to the business of the orchardist. The "wood" will come with good cultivation, the "fruit" in due season. Neither have I time to quarrel with anybody about high or low heads. But we wish to make a perfect tree. That perfection to the orchardist should mean the ability to carry and ripen the heaviest and fairest crops of fruit for many successive years without injury to the tree.

The "inverted umbrella" form of head I see aimed at in many orchards in

different parts of the State. It is the most objectionable form except allowing the tree to throw up two leaders of about equal size, both running nearly perpendicular. These last sooner or later go to destruction by one side splitting down, when the other soon goes in the opposite direction. Many thrifty growing trees go to destruction every year in that way, after they have cost their owner much money and care and just when they begin to pay back his outlay. The first mentioned form is made by cutting out the leader, if there is one, or otherwise, the center branches, throwing the growth, which would naturally pass into the more upright limbs, into the lateral ones; thus leading them away from the trunk to the production of long arms, and soon covering the ground between the trees with a canopy of leaves and resulting in a tendency to throw up water sprouts; and, also, giving increased leverage by which the weight of fruit is liable to injure the tree.

All are familiar with the conical form which the balsam fir takes when grown in open situations. There is a center stem with a large number of side branches longest at the bottom, diminishing in length as we look upward till we see the center still asserting itself above the other parts. This in kind if not in degree is a model for apple, pear, peach, and plum trees. It is true that, as we ordinarily buy a lot of trees from the nursery, only a portion of them can be readily trained in this way, but an approximation to the general plan of a central stem is to be aimed at in shaping our young trees. If we can preserve a distinct leader for a height of six feet in an apple tree above the lower branches we have given room in that space for a considerable number of side branches that naturally spread off to about equal distances. When we have done this we have gained this point: that instead of all the limbs coming out within about one foot of the height of the tree, as is the case with many where the centers are cut out, we have a distance of six feet up the bole of the tree, above the lower branches, over which is a greater number of branches to carry the foliage and fruit of the tree. This same form of growing will sometimes continue to a much greater height, but it will often be quite difficult to preserve it to this height, as, with different varieties, the tendencies are quite different.

Some sorts of pears will quite readily follow our balsam fir model, but the rule should always be, in all sorts of fruit trees, to preserve the central stem as long as possible. With a tree in that form a limb never splits down, if it goes down at all it will break, which it does very rarely. We also gain a further advantage of extending the area of our fruit bearing wood upward as well as outward, thus adding to the number of years you can realize perfect fruit from your orchard before the ground is completely shaded by lateral extension. This pyramidal form can be more uniformly attained, too, if your nurseryman will select trees for you adapted to this plan of training.

As to what limbs should be thinned out a man's good sense will readily dictate to him if he will bear in mind what his tree is to attain to in after years, that the limbs may not be too close to each other, and bearing in mind, on the other hand, that every leaf on the tree adds to the thickness of the cambium layer below itself. Hence the slower we are to take out the small, leaf-bearing twigs in the interior of the tree, the more stocky will be the tree.

In conclusion I want to say, when you go into your orchard to prune don't try to see how much you can take off from each tree. But, on the other hand, see how much you can leave on without detriment to the tree; and don't cut an otherwise useful limb because the head is a little out of balance. Time will usually correct that. And don't try to make the heads of all varieties

equally open. If a tree is naturally dense let it be dense still. Don't try to make the head of a Red Astrachan like a King of Tompkins County, nor reduce the number of branches in a Northern Spy to as few as the St. Lawrence naturally carries. For when the bearing stage comes the weight of fruit opens them out, and by the foliage you have retained you have gained the larger trunks and the larger amount of bearing wood.

Mr. Lyon.—I do not quite agree with Mr. Parmelee, that pruning to produce fruit or wood at pleasure is a matter of slight importance. I think that all experienced orchardists will agree with me that by changing the time of pruning we may influence the setting of fruit, or the amount of growth, and this is a matter that at times means a good deal to the practical horticulturist.

I do agree with the author of the address in his advocacy of low heads, and I believe that every man to prune well must have a model, an ideal model in his head, before he cuts a twig. It is an easy matter to take any nursery tree and put the head just where you choose by cutting the top off, where you would have the lower branches start. A central stem should be preserved, and about five main branches should be distributed along it, but should by no means come out together.

Mr. John Thomas.—This suggests to me an item in my own experience. A good many years ago I was in the nursery business a little, raising a few trees for myself and for my neighbors. A small boy at my nearest neighbor's had some tame rabbits, which, before I knew of it, had succeeded in cutting off one-third of my apple trees in the nursery rows, within a few inches of the ground. I considered the work well done and the trees ruined, but they started vigorously the next year, branching, of course, very low, and these same trees made the most satisfactory ones I ever had.

Mr. S. B. Mann of Adrian closed the evening session with a short paper on

THE POMOLOGY OF LENAWEE COUNTY.

Mr. President and Gentlemen:

I feel hardly prepared to attempt a correct report of the pomology of Lenawee county, but will venture to say that there never was a more bountiful crop of apples harvested in the county than that of the fall of 1876. This is putting it pretty strong, for her principal fruit is the apple, and there are to be found on almost every farm in the county large and thrifty apple orchards. In fact it forms one of the most important staples of the county. Without any disposition to boast we feel in Lenawee that finer apples than are shipped from there every year are hard to produce. The crop of last fall, however, proved of very little value, from its overabundance and the bountiful crop all over the country, especially in Southern Ohio and Indiana, for usually Cincinnati has been our best market. Our dealers commenced buying quite briskly of late summer and fall apples, but were loth to touch winter fruit at any price, and very little was packed in comparison with other years. A few of our orchardists put up what they could store in their cellars, but this was but a drop in the bucket compared with what wasted in the orchards. A few of these farmers report that the apples put in their cellars are not keeping good, which is owing, no doubt, to the want of proper care in packing,—the natural result of the little value placed on them. I have talked with some of our dealers who are

yet holding a stock—mostly Baldwins and Northern Spys, and they report them as perfect as when put up.

Pears, peaches and plums have come to be considered as doubtful and unprofitable. A few growers of my acquaintance are having fair success with pears, and one, Mr. Peter Collar, of Palmyra township, planted, last spring, an orchard of 400 pears and 300 plums, sending east for his trees. Many of the more cautious are looking with some doubt upon the venture. The severe winters have destroyed the peach trees almost entirely, and after a hard and determined effort on the part of many it is now considered a failure.

My acquaintance brings to mind one man who has met with success of late in raising peaches in Lenawee county. Mr. Porter Beal, of Rollin township, has an orchard among the numerous little lakes of that part of the county, which yields him a good crop of peaches and plums almost every year.

Some of our orchardists are becoming somewhat disturbed over the fact that the canker worm has very quietly, though surely, gained a lodgment in our county. It is in an orchard known as the "Bailey orchard," consisting of upwards of 3,000 trees. One of the great obstacles to the destruction of the insect is that the trees are very thick,—standing only about twenty feet each way. Mr. Bailey says that he first discovered something the matter with his trees some five or six years ago. He thinks it must have been brought there with scions that were got somewhere in the State of New York. I have not yet seen the orchard, but am told that it is nearly or quite ruined. The best I can say of it is, that the Lenawee County Farmers' Club has taken hold of the matter and put it into the hands of a committee of five, who have held one conference with the owner, and have his agreement to cut away one-half of the trees as the first move. It is to be hoped,—and I feel almost safe in saying,—that the Club will not let go the matter till the pest is routed and destroyed. There are various methods recommended, but all cost some money and a good deal of labor, and the owner of the orchard no doubt feels that the burden is falling heavily on him, and as the orchard is nearly or quite past help, it is feared he may abandon it simply and let it go as it will, which of course must prove very disastrous to the community about him. How much cause for alarm there may be among the pomologists of the county or to this society, which should have an eye to the interests of the entire State, I cannot tell. It is at least one more proof added to the truth of the old adage: "No excellence without labor;" for earnest and continued labor must be expended if this new pest does not become, like the codling moth, a common enemy in our State.

Wednesday Morning.

The first topic of the morning was discussed by Mr. H. Dale Adams, and was entitled

CRAB APPLES—HOW TO GROW AND HOW TO USE THEM.

He said crab apples were not appreciated as much as they ought to be for use in the home, and the fact that the trees bearing this beautiful fruit are perfectly hardy, and all the best sorts exceedingly productive, is a matter worth considering in choice of fruit to be planted for the family. He believed in growing them for canning, for pickling and preserving, and especially for the

making of jelly. Nothing can excel the delicacy of jelly made from the finer kinds of crabs. But the use of the crab apple of which the speaker thought the most was for ornamental purposes, on the lawn and about the house. He would use the trees for single specimens and for grouping. The crab apple trees are not half appreciated as ornamental trees. The foliage is beautiful and add to this the rich colors of the fruit that contrasts so exquisitely with the deep green leaves, and we have a combination that for effect cannot be excelled. He spoke especially of the hyslop crab as being a model of beauty, when the fruit began to put on the rich tint indicating a ripe condition. A plantation of these, he observed, was the most beautiful of the many beautiful things he saw on Traverse peninsula.

Following Mr. Adams' remarks Prof. Beal occupied the attention of the meeting for an hour, with an address on

HORTICULTURAL EXPERIMENTS.*

He spoke of the necessity of more knowledge among the people that cultivate the soil. People do not even practice those which they know to be the best methods. Those who are interested in our agricultural colleges enough to look at their work, propound a great many questions in agriculture and horticulture, regardless of the fact that when they get the solutions in very many instances they do not employ the results to any advantage. As an instance the fact that a rotation of crops is a great improvement in agriculture was given, and still men practice it only occasionally, even although there is no fact more settled.

He said discoveries were made by men who worked to find them out, and it was a rarity to stumble upon one by chance with no effort. It is with difficulty that accurate experiments can be made in horticulture on account of our small control over rain, sunshine, frost, etc. For instance, we may desire to test the value of certain fertilizers as used upon various trees in an orchard, it is the next thing to impossible to secure any two trees that are under like conditions, and the fruits and growth of two trees not dealt with at all may vary as much as any two treated with different fertilizers. Some call for immediate results in horticultural experiments. They know nothing of the difficulties that the experimenter must encounter, nor of the utter worthlessness of decisions arrived at on short notice.

A good experimenter must be honest, patient, skillful, persevering and long suffering, a good observer, and know what has already been accomplished in his line. The Professor added that farmers to be successful in any line of experiment must be students, and particularly in horticultural experiments, must know a good deal of botany and vegetable physiology.

A large number of subjects were suggested as proper for original work or experiments, of which we give a few. In the mutual influence of stalk and scion after all that is said of it, there is very little of definite knowledge, founded on exact observation and experiment. If we knew exactly how far this influence extended it would enable us to make very many practical uses of it; for instance, we would know if we could in our climate make the Baldwin apple and Iona grape hardy enough for safety by putting them upon hardy stocks.

* The full text of this address may be found in the report of the State Board of Agriculture for 1876, page 200.

Irrigation in horticulture is in its infancy, and we need to know how, and how much it will pay. We have yet to learn how to raise peaches in frosty locations, what plants are best for hedges and screens in our latitude, and how much it will pay to thin fruit.

The great questions of pearblight, and yellows in the peach, are unsettled as to their causes or cure. In the destruction of insects there is an endless amount of experimental work to be done. In the deterioration of certain crops, and the remedies by cross-fertilization, and changing of seed, are questions yet in their infancy, and although Darwin has opened a grand field for investigation in this direction, he has but stepped into it.

The improvement of our native fruits is a matter of the greatest importance in our county, and there has almost nothing been done in this direction. Although we are rich in native species that might be improved by cultivation, still nearly everything in the fruit line that we grow is of foreign importation.

The Professor dwelt at some length on the importance of crossing fruits, and quoted the experiments of Rogers and Arnold in fruits and grains, President Wilder, George Campbell, and a dozen others, in various plants. There are but few good workers in this field, yet every one who has worked well has brought out something of real worth. It takes a long time to get accurate results, but they are worth something when established. The future will bring greater exhaustion of soil and more insects, so that experiments of this sort will be required, and still the work will grow no easier with the added years.

President T. T. Lyon then read an address as follows, upon

THE CLASSIFICATION OF FRUITS—HOW THE CATALOGUES OF OUR SOCIETY SHOULD BE ARRANGED.

This society, in the discharge of the duty it may be assumed to owe to the people of the State, seems, almost from the time when it came into existence, to have realized the great need, to the public, of better information on the subject of varieties of fruits best adapted to meet the wants of the planters of our State.

Up to the present time its efforts in this direction have been mainly devoted to the preparation of lists of varieties, calculated to more or less fully meet the varied circumstances under which planting is to be done,—certainly a very important object, in view of the well known fact that, as a rule, the composition of our orchards may be said to have been determined very largely,—in many cases almost entirely—by the dictum of irresponsible tree peddlers, or of tree growers; both, obviously, having interests in the matter often quite diverse from those of the orchardist or gardener; and hence not just the parties to whom a judicious and careful planter should apply for advice in a matter of such moment, and involving steps which, once taken, must become more or less operative for a lifetime. Even when such advice is honestly and wisely given, however, in dealing with any but trustworthy parties, the planter not unfrequently learns, after nursing his plantation up to the period of fructification, that, either through the carelessness or dishonesty of the dealer, varieties not ordered, and not unfrequently spurious or worthless ones, have been foisted upon him.

To the question—Is there not a remedy for this difficulty? We can only repeat the oft reiterated reply—learn well what you want, and buy directly

of persons known to be worthy of confidence. Few persons are able to recognize varieties from the peculiarities of the wood growth; hence the buyer must trust mainly to the honesty and carefulness of the nurseryman—a necessity that can hardly be said to exist, in so broad and important a sense, in any other class of business transactions. To this we may be allowed to add the further remark, that varieties differ greatly in vigor, and also in ease and certainty of propagation; hence to require the propagator to supply a class of fruits—as the apple—in all its varieties, at the same price, is but offering a premium for dishonesty, by tempting him to the incorrect naming of varieties; as it is beyond question true that certain varieties can be produced at half the cost of others of similar size. We will not, however, profess to entertain any very confident hopes of the effectiveness of these suggestions, with the very common circumstance in mind, that it is by no means unusual for otherwise intelligent and clear-headed people to yield to the seduction of artful self-constituted and often entirely unknown peddlers of novelties, armed with wonderful pictures, taken, of course, from nature; or with specimen fruits as fair and magnificent as those fabled to have grown in the garden of the Hesperides; but of whose connexion with the plants alleged to have produced them, they can only know from the “*ipse dixit*” of the unknown vendor; engaging to pay extravagant prices for such plants, instead of applying to dealers of acknowledged reputation and known integrity for varieties of established character, at established prices.

Beyond the purpose to provide lists of fruits as guides to the filling up of plantations, the society may be supposed to have been actuated by the wish to indicate, in a manner calculated to command confidence abroad, the measure of success of the sorts recommended, as compared with their standing elsewhere, as an indication of the general adaptation of our State to pursuits of this character.

If we shall be at the trouble to institute an examination into the actual constitution of the orchards of our State, considered at large, we can hardly fail to be impressed with the fact that in despite of the large amount of valuable knowledge disseminated on this subject during the past half century, a very large proportion of the whole is comparatively valueless, on account of the unwise selection of varieties for the purposes intended, or of ignorance (or something worse), in the management; and it certainly may add much to our surprise at this circumstance to discover that even those orchards ostensibly planted for commercial purposes, and which, hence, should have commanded especial care and wisdom in the selection of the varieties, offer, as a whole, little exception to this rule.

Soon after the organization of the society, it framed a list of twelve varieties of apples, which it commended to the planters of the State as worthy of cultivation. The society does not seem to have considered this as a satisfactory or final expression of its views, as we may infer from the circumstance that only a year or two later a committee was raised, charged with the duty of preparing a more full and complete list or set of lists, embracing recommendations in all the classes of fruits usually grown in our State. This committee developed very marked differences of opinion among its members; and, after giving several months to the consideration of the matter, finally cut the gordian knot by reporting in favor of three distinct lists, adapted to the varied wants likely to occur among planters, whether planting for commercial, family or amateur purposes. These lists, after running the gauntlet of criticism in committee, and of discussion by the society as a whole, were finally placed, where they

have now stood for four or five years, upon the record of the society as its matured conclusion, and its unqualified recommendation to the planters of the State.

This being the condition of affairs, we may very reasonably inquire how many of the thousands who have planted orchards in Michigan during these years, have been, to a considerable extent, induced to follow these lists in their selections for planting. If there be any such, they certainly have not come within the sphere of our observation. Indeed, so diverse were the views of even the members of the committee whose workmanship we are now considering, that important portions of their final report were but a compromise, accepted for the purpose of securing a unanimous report, and we have reason to seriously doubt whether they would be largely followed, even by the members of the committee, in their own planting.

That such should be the result of so important and carefully considered an act of the society, may well create surprise, at first thought; but when we come to consider the great contrariety of circumstances under which planting is done, as well as the diversified tastes and fancies of the planters, we will be quite as likely to wonder, rather, that the hope of producing concert of action in this particular, should have been seriously entertained. Indeed, when we consider the great variety of modifying circumstances, such as soils, climates, the special and peculiar objects of planting, and the contrariety of circumstances under which various markets are to be supplied, as well as the greater or less extent to which the wants or fancies of individual consumers may affect the problem, it may fairly be doubted whether anything approaching unanimity of practice ought to be expected; and this will appear the more reasonable if we consider that the insular character of our State so peculiarly and wonderfully modifies its climate, and by its influence upon the problem of transportation constitutes such a multiplicity of special and peculiar requirements, that very few localities of considerable extent can be said to be subject to the same wants, or to require the same set of varieties of fruits for their proper and profitable accommodation.

Yet another circumstance that may properly have a bearing against the framing and recommending of any list or lists of varieties upon the theory under consideration is the fact that, with the very large number of sorts now in cultivation, no single variety can be named that shall not be liable to the charge that other sorts are at least equally desirable, and possibly for some purposes, even more so; and certainly no considerable list of varieties can be devised that may not be opposed by another entirely distinct one that shall be, at least in some important particulars, fully its equal if not even its superior. This will be found to be in a very special sense true of lists devised for other than simply market purposes.

Assuming then that the recommending of lists of varieties for general cultivation has failed to accomplish the anticipated results as fully as had been hoped, we next come to consider in what way the society may be able to modify its action so as to more perfectly conduce to the desired object,—that of the encouraging of useful and valuable varieties of fruits to the exclusion of the unworthy or worthless ones.

Most of the leading societies of the day seem to have pursued a course akin to that adopted by ourselves; although we are not sure that all have not ere this modified their modes of operation. Those familiar with horticultural history will be able to recall the fact that such was the original plan of the national

(American Pomological) society. The managers of that society, however, were early forced to the conclusion that so greatly do varieties vary, even within comparatively narrow limits, that there could be no reasonable hope that they would succeed in the framing of satisfactory lists to be recommended for general cultivation throughout any considerable region of our common country. That society, therefore, as early as 1858 or 1860, appointed a committee embracing several of the most eminent and noted pomologists of our country to devise a plan of operations that should, as far as possible, avoid these difficulties, at the same time providing, as far as practicable under the circumstances, for the special requirements of the various localities.

After two years of labor over this difficult problem this committee submitted a report in which they borrowed, in part, from the plan of the catalogue of the London (England), Horticultural Society; and in part, perhaps, from other sources, elaborating from the whole the plan of the present catalogue of the American Pomological Society,—a catalogue that has now come to be recognized and quoted as authority by the pomological writers, not of this country only, but also of Europe. To the plan of this catalogue, therefore, we may very naturally turn for hints by which to be guided in casting about for an improved plan of operations; and we may feel the more confidence in doing so from the significant circumstance that other and older organizations have already led the way in this direction.

In the catalogue under consideration the names of varieties are arranged in alphabetical order at the left side of the left hand page. Immediately at the right of the names are arranged seven columns, in which, by a very simple system of abbreviations, are given descriptions of these fruits; including size, form, color, quality, uses, season, and place of origin. The remainder of the two adjacent pages is devoted to a series of fifty vertical columns,—one to each of the States and Territories, including the British Provinces. In these columns the varieties recommended are indicated by a star in line opposite the name, and if esteemed very valuable, by two stars. Varieties newly introduced and considered promising are indicated by a dagger. From this explanation it will be seen that the names of each fruit recommended from any one of these localities appears in its regular alphabetical order in the column of varieties, and that by tracing its parallel across the columns spoken of we find first its description and farther on the stars which determine in which of the States it is recommended for cultivation. The large number of localities represented involves the employment of two pages for the purpose, and to facilitate the tracing of each, the varieties are numbered consecutively, upon the left margin of each page.

For the purpose of illustrating the manner in which this general plan may be adapted to the local requirements of the State of Michigan, we may explain that a serious difficulty in the framing of our lists, as they at present stand, arises in part from the practical impossibility of meeting the wants of localities, and in part, doubtless, from the mere lack of experience with certain sorts in some localities. These circumstances would seem to point to the necessity of dividing the State into districts, each of which may be allowed a column in the manner already indicated. The smaller space required would render it practicable to provide for a more full and minute designation of the qualities or uses of each variety, as well as of its measure of success and desirability in our State; while, by devoting the two opposite consecutive pages to the purpose, with a resort to numbering as heretofore described, abundant space may be had

for qualifying remarks, which are frequently found to be of great importance to the accurate and reliable qualifying of varieties. In a plan for the purpose proposed, it also seems important to provide for a proper expression of the special uses to which varieties are best adapted; and to, in some concise and simple manner, indicate the measure of their value for such uses, thus constituting the proposed catalogue a means, by the judicious use of which the planter, in the lack of practical acquaintance with varieties, may with reasonable certainty determine how far a given variety can be relied on to meet his special requirements.

The usual pomological terms, "good," "very good" and "best," are employed as mere indications of the three grades of quality of fruit, and have no reference to anything beyond; so that even such a fruit as the old and now little known Herefordshire Pearmain, which usually for nine years out of ten is so scabby as to be utterly without value, must, so far as these terms are employed, be designated as "best." To avoid any misapprehension growing out of the use of these terms in the usual manner, we propose to combine the expression of the uses and values in a series of three columns headed respectively "dessert," "cooking" and "market," and to indicate the value of the variety for each of these purposes in its proper column by numbers ranging from one to ten, the latter expressing the highest measure of value for the purpose indicated.

With a catalogue of this character carefully and judiciously constructed it will be readily seen that any planter can at a glance determine how far any one of the varieties catalogued is adapted to his peculiar wants, purposes or fancies, and will be able to make up his own lists in accordance with such wants, and with trustworthy means at hand to enable him to judge wisely as to what sorts will prove best calculated to meet the peculiar purpose he may have in view.

In order to put the ideas suggested into tangible form, and to enable the reader to the more perfectly comprehend the arrangement as proposed, we have catalogued the varieties included in the society's lists of apples recommended for general cultivation, and adapted the same to the size of a page of the last volume of its transactions, or to two pages if the second shall be employed for qualifying remarks as heretofore suggested. (See pages 32-3.)

A little consideration will doubtless bring us to the conclusion that a catalogue of the character proposed can never be assumed to be complete, inasmuch as the variations of climates and soils, as well as the variable wants and fancies of planters, and even the fickleness of markets, to say nothing of the occasional bringing out of new fruits, must, as we find to be the case with the works of writers on fruits (and indeed to a greater or less extent in almost all departments of literature) create a necessity for the constant revision of our work in these respects. One of the circumstances, moreover, upon which the value of such a work must greatly depend will be found to be the ability to secure its just and assured expression of the capabilities of the State as a whole, in other words to protect it against undue modification from merely local influences—a tendency to be the more carefully guarded against for the reason that the meetings of the society occur under such varying circumstances that should the work of revision be retained in the hands of the membership at large it would be quite liable to at least occasionally fall into the hands of those whose knowledge of the subject might prove to be too local for the scope of the work to be undertaken.

SAMPLE OF THE METHOD OF CLASSIFICATION RECOMMENDED.

NUMBER.	NAMES.*	Description.						Use and Value, Scale 1 to 10.				Locality.					REMARKS.†
		Size.	Form.	Color.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.	Locality.						
											East.	Center.	South.	Southern Lake Shore.	Northern Lake Shore.		
1	American Summer Pearmain.....	m.	o.	y. r.	b.	Sept.	Am.	9	2	4	*	*	*	---	---	Tree a slow grower, and fruit sometimes scabby and undersized.	
2	Autumn Sweet.....	m.	r. f.	g. y.	v. g.	Oct. Nov.	Am.	7	5	6	*	*	*	*	*	Excellent, but not generally grown—worthy of more attention.	
3	Baldy's Sweet.....	l.	r. c.	r. s.	v. g.	Nov. Dec.	N. Y.	4	6	3	*	*	*	*	*	Probably the best early winter, baking, sweet apple.	
4	Baldwin.....	l.	r. c.	r. y.	v. g.	Dec. Mar.	Mass.	3	10	9	8	4	8	8	*	Frequently affected with "bitter rot." Tree somewhat tender.	
5	Belmont.....	l.	r. c.	y. r.	b.	Dec. Feb.	Penn.	10	5	4	*	*	*	*	*	One of the very finest and most beautiful, but not usually profitable.	
6	Blenheim Pippin.....	l.	r. f.	y. r.	v. g.	Nov. Jan.	Eng.	3	10	7	*	*	*	*	---	A very showy, sprightly, cooking apple. Tree very vigorous. A hardy bearer.	
7	Carolina Red June.....	m.	r. c.	r.	v. g.	Aug.	Can.	7	2	3	*	*	*	*	---	Excellent in quality, often overbears. Best at the southwest.	
8	Chenango Strawberry.....	l.	o. c.	g. r.	v. g.	Sept. Oct.	N. Y.	8	4	6	*	*	*	*	*	Beautiful and good; its greatest drawback being the season of ripening.	
9	Duchess of Oldenburg.....	m.	r. f.	y. r.	g.	Aug. Sept.	Rus.	2	10	8	*	*	*	*	*	A beautiful, vigorous, hardy tree. Fruit showy, but short lived—poor in quality.	
10	Dyer or Pomme Royal.....	m.	r.	g. y.	v. g.	Sept. Nov.	Fr.	8	8	5	*	*	*	---	---	An excellent, very high flavored dessert and cooking fruit.	
11	Early Harvest.....	m.	r. f.	g. y.	v. g.	Aug.	Am.	6	8	4	*	*	*	*	*	A good ordinary fruit. The earliest good apple. Not always profitable.	
12	Early Joe.....	s.	f. c.	y. r.	b.	Aug. Sept.	N. Y.	8	3	1	*	*	*	*	*	One of the very finest dessert fruits, of little value for other purposes. Tree a poor grower.	
13	Early Strawberry.....	s.	r.	r. s.	v. g.	Aug. Sept.	N. Y.	8	1	3	*	*	*	*	*	A beautiful tree, with small but excellent and showy fruit, ripening in succession.	
14	Esopus Spitzenburg.....	l.	o.	y. r.	b.	Dec. Apr.	N. Y.	10	6	3	*	*	*	---	---	Variably successful—not usually as fine as in eastern New York.	
15	Fall Pippin.....	l.	r. f.	g. y.	v. g.	Nov. Dec.	Am.	9	8	7	*	*	*	*	*	Has few equals in its season. Its chief fault is a tendency to scab and crack.	
16	Famense.....	m.	r. f.	r. s.	v. g.	Oct. Dec.	Fr?	6	3	2	*	*	*	*	*	Formerly very popular everywhere; but losing reputation in the older portions of the State.	
17	Garden Royal.....	s.	f.	y. r.	b.	Sept.	Mass.	10	2	3	*	*	*	---	---	Strictly an amateur fruit, but one that no fruit lover's home should be without.	
18	Golden Russet.....	m.	r. f.	y. rus.	b.	Dec. May.	Eng.	10	2	8	*	*	*	*	*	Has few superiors among persons who know how to keep it.	
19	Grimes' Golden.....	m.	r. f.	g. y.	v. g.	Dec. Mar.	Vir.	8	4	8	*	*	*	*	*	A beautiful and highly aromatic fruit; productive and a fine keeper.	
20	Haskell Sweet.....	m.	l.	g. y.	v. g.	Sept.	Mass.	4	6	3	*	*	*	---	---	A very rich sweet apple for September.	
21	Hawley.....	l.	r.	g. y.	b.	Sept.	N. Y.	7	5	3	*	*	*	*	*	One of the very best of large apples, but will not keep after maturing.	
22	Hubbardston Nonsuch.....	l.	r. c.	y. r.	b.	Dec. Feb.	Mass.	9	6	8	*	*	*	*	*	Has few, if any, superiors in quality or appearance among early winter apples.	
23	Jersey Sweet.....	m.	r.	y. r.	v. g.	Sept.	Am.	5	6	2	*	*	*	*	---	Probably the richest and most desirable baking sweet apple for early September.	

No.	Name	M.	P.C.	Y.P.	V.G.	N.Y.	7	8	*	*	*
24	Jonathan.....	m.	r.c.	y.p.	v.g.	Nov. Feb.	N. Y.	7	4	s	*
25	Keswick Codlin.....	l.	r.c.	g.y.	g.	Oct.	Eng.	1	10	7	*
26	King of Tompkins County.....	l.	r.	y.r.	v.g.	Dec. Mar.	N. J.?	5	6	7	*
27	Lady's Sweet.....	l.	y.r.	y.r.	v.g.	Dec. Mar.	N. Y.	3	6	2	*
28	Large Yellow Bough.....	l.	o.	g.y.	v.g.	Aug.	Am.	3	6	2	*
29	Lowell.....	l.	r.c.	g.y.	v.g.	Sept.	Am.	5	7	9	*
30	Maiden's Blush.....	m.	f.	y.r.	g.	Aug. Sept.	N. J.	2	10	10	**
31	Melon.....	l.	f.c.	y.r.	b.	Nov. Dec.	N. Y.	10	10	5	*
32	Northern Spy.....	l.	r.c.	y.r.	b.	Dec. Mar.	N. Y.	10	9	9	*
33	Ohio Nonpareil.....	l.	r.	y.r.	v.g.	Oct., Dec.	Ohio.	8	6	8	*
34	Peck's Pleasant.....	l.	p.f.	g.y.	v.g.	Dec. Mar.	Conn.	6	7	8	*
35	Porter.....	l.	o.	y.r.	v.g.	Sept.	Mass.	6	5	5	*
36	Primate.....	m.	c.	g.y.	b.	Aug. N. Y.?	N. Y.?	10	6	7	*
37	Red Astrachan.....	l.	r.	y.r.	g.	Aug.	Swed.	3	10	9	**
38	Red Canada.....	m.	r.c.	y.r.	b.	Jan. June.	N. E.?	10	4	10	**
39	Rhode Island Greening.....	l.	r.f.	g.y.	v.g.	Dec. Mar.	R. I.?	8	9	9	*
40	Roxbury Russet.....	m.	r.f.	y.rus.	v.g.	Jan. June.	Mass.	5	9	6	*
41	Shawsee Beauty.....	m.	f.	y.r.	b.	Nov. Jan.	Mich.	10	6	7	*
42	Sine Qua Non.....	m.	r.f.	g.r.	v.g.	Aug. N. Y.	N. Y.	8	4	2	*
43	Summer Rose.....	s.	r.	y.r.	b.	Aug.	Am.	10	2	2	*
44	Swaar.....	l.	r.f.	g.y.	b.	Dec. May.	N. Y.	10	1	1	*
45	Talman Sweet.....	m.	r.f.	g.y.	v.g.	Dec. Mar.	R. I.	3	7	4	*
46	Twenty Ounce.....	l.	r.	r.s.	g.	Nov. Dec.	Conn.	--	8	9	*
47	Wagner.....	m.	r.f.	y.r.	b.	Dec. Mar.	N. Y.	8	6	6	*
48	Westfield Seek-no-further.....	m.	r.c.	y.r.	b.	Nov. Feb.	Conn.	8	4	7	*
49	Yellow Bellflower.....	l.	c.	g.y.	v.g.	Dec. Mar.	N. J.	6	9	7	*

* In arranging the foregoing catalogue, in the column expressing size, l. represents large; m., medium; and s., small. In the column for form, r. represents round; o., oblong; c., conical; f., flat or flattened. In that expressing color, y. is put for yellow; g., green; b., black; v. k., very good; and b., best—having reference strictly to the standard first five, the three columns headed "Use and Value," the numbers ranging from 0 to 9 express the gradations of utility or value, whether of true or fruit, that enter into the problem of money-producing power. From separated consideration, and the gradation of quality, the purpose of showing the possible scope of the proposed plan in this direction. We therefore trust that the present remark will not be subjected to criticism on account of possible objections to the statements they may contain. They should, if adopted, be of course confined to such statements as may be thought important, but which cannot be expressed in the tabulated portions of the catalogue.

The most effectual means we have been able to devise as a protection against this danger is to take up for revision—say at the June and December meetings—such lists upon the catalogues as shall then be most nearly in season, as, for instance, small fruits, cherries and perhaps plums, in June, and the other classes of fruits at the December session, making a record of everything noteworthy respecting any of the varieties, and also inviting the proposal of additional varieties for places in the catalogue. At the annual meeting a person or a committee should be designated in each district of the State, to be known as a local or district fruit committee, and charged with the duty of embodying in an annual report to the society at its annual meeting any and all facts bearing upon the status of varieties of fruits, as well as any other useful facts of a pomological character arising in their districts respectively.

The society should also select a standing fruit committee to hold over, from year to year, during the pleasure of the society, to be composed of persons selected with special reference to their standing as pomologists, and should be exclusively charged with the duty of preparing an annual revision of the catalogue in time for its annual publication in the volume of transactions of the society—such revision to be performed in the light of the information conveyed by the discussions of the society, with the aid of the reports of the local committees, together with their own personal acquaintance with, and judgment of the questions involved.

In proposing, as we in effect do, that the society shall abandon its earlier practice in this direction, and assume a work which, as has already been freely admitted, we can never even hope to finish, we may, with great propriety, be asked—what important advantages are to be secured by so essential a departure from the line of our earlier practice? We reply—our present lists fail of the designed effect, because they supply no means from which the planter may form an intelligent judgment as to the soundness of our recommendations, nor yet as to their adaptedness to his special wants, as they merely select a certain number of sorts, arbitrarily, and offer them for the most part unqualifiedly. On the other hand, the proposed catalogue specifies the valuable qualities of each variety, as well as the degree of each quality; and, in so doing, supplies just the kind of information required by the planter to enable him to determine as to its capacity to meet his wants. We may also add, instead of the meagre lists at present recommended, the proposed catalogue would doubtless grow, by gradual accretion, to include, and thus compare with each other, nearly or quite all the really useful and valuable varieties introduced and proved in the state; while those superseded and dropped from cultivation, would, in the course of revision, yield their places to other and better sorts. The results of all this would naturally be, that the catalogue of the society would come to be considered as a source of information from which all requiring aid in this direction would be able to draw the material to form their lists; each making his selections to meet the special purposes he may have in view. In fact, to the great mass of planters, it might come to stand in place of the voluminous "fruit books," which but rarely find a place upon the tables of the great mass of orchardists. For such purpose, it might perhaps come to be published, as a pamphlet, separately from the society's transactions, as is now the case with the catalogue of the American Pomological Society.

We wish to be understood as not claiming any considerable degree of originality in the devising of the plan of the proposed catalogue, inasmuch as that of the American Pomological Society is one of the chief sources from which

the ideas embodied in it have been drawn, while other societies, and notably that of Ohio, have already acted upon the same. We are not, however, aware that any society has adopted the proposed mode of classifying fruits with reference to the uses to which they may be adapted; and of classifying or assigning them a rank according to a graduated scale; the Ohio Horticultural Society having merely divided the state into districts, and applied the proposed system of starrng to each.

A few words respecting the influence that a catalogue of the character proposed may be made to exert upon the reputation of our State, as to its adaptation to the culture of fruits, and we close. As we have previously remarked, it would require to be annually revised and republished; not in the volume of transactions merely, but also in a separate issue in pamphlet form, as a means of placing it within reach of the great mass of our people. In this form it could be brought within reach of the great army of emigrants who, each year, land upon our shores from Europe; and who, for the most part, find homes at the west; and it might even be brought to their notice before leaving their European homes; and in both these ways become an important instrument for attracting a share of such immigration to Michigan. By means of a system of exchanges with kindred societies, as well as in various other ways, it could be made to disseminate a knowledge of the superior fruit-growing capacity of our State among the many in the overcrowded east, who, looking to the great west as their "*ultima thule*," mingle in the grand westward march; and who in many cases, doubtless, only need some adequate comprehension of the special capacities of our lake-engirdled state to be impelled to cast their lot among us.

This, however, is but the shadowing forth of an ulterior and possible result. The great primary purpose of all our operations as a society, should, doubtless, be to educate our own people; and by supplying them with the knowledge requisite to enable them to select, plant and cultivate wisely and efficiently, to secure an increase in the quantity, quality and money value of the pomological products of our State; at the same time laboring for the elevation of the public taste to that more just appreciation of high quality, as distinguished from mere quantity, which seems, in some sense, to be the essential attribute of mental refinement and elevation.

That these objects are desirable and even important, we presume no one will question. Whether or not the proposed plan is calculated to especially minister to the desired objects, is a question to the consideration of which we invite your careful attention.

On motion, a committee of three, consisting of Messrs. H. D. Adams, C. N. Merriman, and A. G. Gulley, were selected, to whom was referred the recommendations in Mr. Lyon's paper, said committee to make a full report at the June meeting.

Wednesday Afternoon.

The Secretary called attention to a case of dried fruit, the product of the Williams' process, the same having been donated to the society to use as seems best.

After the reading of a short poem from the pen of John Southard of Oxford,

the society listened to a paper sent in by Mr. I. S. Linderman of South Haven upon the topic

ECONOMY IN MARKETING FRUITS.

GENTLEMEN—Though deprived of the privilege of meeting with you personally, I have been honored by the invitation to contribute to the "feast of good things," to be served up by our society at this meeting. I accept the invitation, and though my offering may add nothing to the richness of your intellectual entertainments, it may possibly possess the merit of adding to its variety.

Economy in methods of marketing fruits, is the subject proposed for our consideration, and it is certainly one of great practical importance to us. The marketing of fruits is inseparably connected with their growing, each depending on the other for profit and success. The method of marketing depends very much on the manner in which the fruit is grown, as well as the kind of fruit, nearness to market and many other circumstances. The growing of fruit for commercial purposes, as a business, is comparatively new, at least in our own State, but it is increasing with wonderful rapidity. This is the result of various causes, among which we may mention a few of the most important as follows:

1st. The increasing consumption of fruits by all the classes of our citizens, thereby keeping the demand fully up to the supply of good fruit.

2d. The superior size, quality and beauty of our fruit, thereby encouraging a still greater consumption.

3d. Our central location and proximity to the principal markets of the Northwest, our unequaled facilities for reaching them in the shortest time with our fruit in the best possible condition and at a small expense.

4th. Our unequalled climate, especially in the fruit belt, that enables us to furnish those finer but perishable fruits that are in almost unlimited demand, and that cannot be so successfully grown in any other locality in the North, consequently furnishing us a remunerative market for all the good fruit that we shall be likely to raise.

The increasing demand, especially for the finer kinds of fruits in all parts of our country, and the facilities for supplying them, have given fruit-growing a wonderful stimulus, and in order to supply this demand it is necessary to grow not only more but better fruit.

This necessity has caused a great deal of investigation and discussion as to the best varieties of the different kinds of fruits, best soil, methods of cultivation, etc., and last but not least, the best methods of marketing.

This question is one of particular importance to every person who grows more fruit than they need for home consumption, and the answer must necessarily depend on so many circumstances and contingencies that where the crop to be disposed of is large, it requires more real ability to secure the best results than it does to raise the fruit. I must therefore treat more of general principles than special instructions.

The first principle that I wish to emphasize particularly is this, "honesty is the best policy;" that aside from all considerations of honor or conscience, it will pay best. Some may think this is so obvious that it needs no emphasizing or enforcing, but several years experience in the fruit trade has taught me that honest fruit packing is the exception instead of the rule.

2d. Always use packages of full size if possible to obtain them, and fill as full as they will bear.

3d. Sort and pack your fruit as you would if the purchaser stood by to see it done. Honesty requires that all these shall be strictly attended to.

In seasons when the supply is not equal to the demand, there is no difficulty in obtaining good prices; but when there is more than the market requires (like the apple crop of the last season), then the solving of the problem of a profitable market becomes difficult, and requires not only sound judgment, but a good stock of general information respecting the extent of the crop in the whole country as well as the probable demand, and that depends very much on the ability of the people to pay for what they want.

Our apple crop the past season was probably the largest that the country has ever produced, but I presume not very profitable. Thousands of barrels have probably been sent to market at a total loss. This ought not to have been and was caused I think by pursuing a wrong method in marketing, or rather marketing haphazard, without any method.

"It is an easy matter to tell what ought not to be done," says the *Inquirer*. "but a very different thing to point out a remedy for ruinous prices when we have such an enormous crop as that of last season. Tell us what to do under such circumstances." Very well, I will give you my views. Every one knew that the supply was greater than the market required.

PROPOSED REMEDY.

1st. Suppose the farmers had only put one-half their fruit on the market, then there would have been no overstock and apples would probably have brought a fair price, say \$1.50 to \$2.50 per barrel.

2d. Suppose the one-half that was put on the market had been the choicest selection from the whole crop, would they not have been at least fifty cents per barrel more than the average all together? I think there is no doubt of it. If these estimates of probabilities rest on a fair basis, the result would be about as follows:

1st. By withholding one-half our crop from market we have gained fifty cents per barrel in price, on account of the supply being only equal to the demand.

2d. We have also gained an additional fifty cents on account of the extra quality, by selecting the choicest.

Will this pay? Let us see: Economy in methods of marketing shows the best results in net cash. In order to arrive at that we must come right down to the cost in dollars and cents. That will be found about as follows: Barrels for packing apples, good ones, about 35 cents; picking, packing, and delivering at depot, 15 cents; freight, drayage, etc., average 35 cents; commission 25 cents, 60 cents. This would make the expense per barrel about \$1.10. Has the whole crop sent to market averaged over \$1.25 per barrel? If that is a fair average, the cost being \$1.10, leaves 15 cents net to the farmer for apples and profit.

Has the one million barrels, more or less, sent to market from this State averaged higher than that? I fear not, but I wish to be sure to get them as high as any one can claim with any propriety, say \$1.35, quite up to the highest quotations in Detroit at the present time, which is surely too high for a fair average in this case. We will accept it, however, as the basis of our estimates

the result would then be as follows: Sold at \$1.35, cost \$1.10, leaving for apples and profit 25 cents per barrel.

Now let us apply the proposed remedy for these unremunerative prices.

1st. We propose withholding one-half the crop from the market, so as not to break it down, and thereby gain fifty cents per barrel in price, but possibly we shall gain only half that, say \$1.60, cost \$1.10, net 50 cents per barrel. We should probably gain the 50 cents claimed, that would be \$1.75, cost \$1.10, net 75 cents per barrel.

2d. We propose to select the fruit, take one-half only, and that the very choicest, and this we believe would add at least fifty cents per barrel to the value on account of the extra quality. This fifty cents added would make the price \$2.35, cost \$1.10, net \$1.25.

Is the estimated gain from the causes assigned too large? I hardly think they will be considered so. Summary, \$1.35 average price, net 25 cents; one-half only on market, \$1.85, 75 cents; one-half only of those extra, \$2.35, net \$1.25. I am sure that some will probably consider these estimates visionary and the results claimed fallacious, for no one can fully appreciate the real difference in sorting and packing fruit, unless he has studied the subject thoroughly and observed closely for a long time.

Here lies buried the great secret of success. Men have sought for it patiently and perseveringly by studying how to grow more fruit and in other ways, but they have only partially succeeded, because they have overlooked the importance of one of the greatest essentials of success, the proportion of expenses as compared with the net receipts. Men can appreciate the per cent in interest but they ignore it in fruit selling. As I am anxious that this part of my subject shall be thoroughly understood, I will try to make it clear by an illustration.

We averaged the sale of our apple crop at \$1.35, cost \$1.10, net 25 cents. The expense was over 80 per cent of the sales, and the net less than 20 per cent. The apples sold for \$2.35, cost \$1.10, left \$1.25 net, the expenses being only about 47 per cent and the net 53 per cent. The first sales required 5 barrels to net \$1.25, the second sale required 1 barrel to net \$1.25. First sale, gross receipts, \$6.75; second sale, gross receipts, \$2.36, only a fraction over one-third of gross receipts of first sale.

Let us now close up our apple account. As they were sold they brought 25c. net, but as we proposed to sell only half we must count the price of two barrels in the first sales against one in the latter case. Two bbls. at 25c per bbl. net—50 cents; and one bbl. at \$1.25 net, a gain of 75 cents, gives a clear profit of 150 per cent, and one half the crop still on hand. Let us now dispose of that.

If the best results are to be realized by fruit growers, every neighborhood engaged in the business needs a good drier. Last fall apples were dried on shares, the farmer receiving one-half the dried fruit, which pays 15 to 30 cents per bushel. I saw an article a short time ago of one company that had bought for drying 25,000 bushels, and I think the price paid was 25 cents per bushel. Suppose this half of our crop which we are now considering had brought us 20 cents per bushel, and they were certainly worth that for drying, it would add about 60 cents per bbl. to our price already realized, making our net receipts \$1.76 per bbl. instead of \$1.25 as heretofore reckoned. As the crop is now disposed of let us strike the balance.

One bbl. sold at \$1.25 net.....	\$1 25
One bbl. dried at 60c net.....	60
	<hr/>
	\$1 85
Cost of two barrels at 25c each.....	50
	<hr/>
Net gain, clear profit, 250 per cent.....	\$1 35

I have confined myself thus far to the consideration of the apple crop, as that is the leading fruit crop of our State, but the principle that I am advocating, reducing the proportionate expense of marketing, applies to all sorts of fruits, and the comparative advantages that may be realized are even greater in some other kinds of fruits. I have not the time, neither is it necessary to go over the whole or even a large number of the different kinds, for the same principle applies to all; I shall, therefore, content myself by applying it in only one other case.

The enhanced value of fruit as effected by thorough packing and sorting applies with peculiar force to my special favorite

THE PEACH.

Let us come right down to dollars and cents:

Cost and Profit of Peaches.

	CENTS.
Basket, top, and tarletan, per basket.....	07½
Picking, sorting, packing, and delivering.....	10
Freight, drayage, etc., average.....	12½
	<hr/>
Total exclusive of fruit and commission.....	30

Fruit Sold.

	PER CENT.
At 40c, with commission 4c, basket, etc., 30c, nets 6c.	
At 50c, with expenses 35c, nets 15c, gain of.....	250
At 60c, with expenses 36c, nets 24c, gain of.....	400
At 70c, with expenses 37c, nets 33c, gain of.....	550
At 80c, with expenses 38c, nets 42c, gain of.....	700
At \$1, with expenses 40c, nets 60c, gain of.....	1000

These are facts! Do the fruit men fully realize their significance? I fear not.

I believe a majority of the farmers that grow peaches for market often lose from two to 500 per cent in net results simply for lack of knowledge, care, and honesty in putting up their fruit.

Why do I believe it? As this part of my subject is the *pivot*, I'll tell you, even at the risk of being considered tedious or egotistical.

In matters of this kind, many people want definite statements, instead of general principles, so that they can compare actual results.

During the past season I determined to pack my peaches just as well as it was possible to do it, and to grade them carefully, and this was the result. My extra peaches of all varieties sold in Chicago at from \$1.00 to \$1.25 per basket, when the highest quotations for fancy would only be from 75 to 90c. I have

stood in that market and seen peaches sold at 60 to 70 cents, and others very little if any better, sell at \$1.00; now why is this? The former were put up in poor rough baskets,—some say it makes no difference about the basket being full, consequently rolling and getting bruised,—while the \$1.00 peaches were in smooth, neat, clean, full packages. Those 60 cent peaches netted about 24 cents, and the \$1.00 peaches about 60 cents. So that one basket at \$1.00 netted as much as 2½ baskets at 60 cents. The difference in cash was about as follows:

	CENTS.
Good basket more than poor.....	1½
Additional peaches to fill the basket full.....	5
Additional time to pack them nice.....	1½
Additional commission for selling at \$1.00.....	4
<hr/>	
Whole additional cost.....	12
<hr/>	
Additional amount sold for.....	40
Cost, deducted.....	12
<hr/>	
Net gain.....	28
Net gain, per cent.....	116

It may be claimed that this is an extreme case. I admit it; but it is nevertheless fairly stated and not exaggerated in the least. The 60-cent peaches referred to were put up by a farmer of my acquaintance, the fruit was honestly sorted, but the baskets were not filled, and in fact there is not one basket in ten put up by that class of growers that is properly filled. The simple matter of filling the baskets properly would add to the selling price from 10 to 25 cents. After the foregoing illustrations of the net receipts from the different qualities of fruit, it will surprise no one when I claim that we raise too much fruit from a given number of trees. A fruit tree that is allowed to overbear is injured, and the fruit is of inferior size, flavor and general appearance. When a tree is overloaded more net money may be realized by picking off half or three-quarters, or even more, when the fruit is small, thereby making the balance extra fine, than by allowing the whole crop to mature. And that is not all, your tree will be in much better condition for future usefulness.

There is a great deal said about raising more fruit; but I believe our interest lies more in the improvement of quality than the increase in quantity. It is an admitted fact that our fruit enemies are rapidly increasing, especially of the apples, and under our present mismanagement, we have no right to expect any other result. About one-half of our apple crop is now ruined annually, and only a few years longer will be required to have the whole crop in the same condition if we pursue the same course in the future as in the past.

To meet it is a matter of deep regret to see men enlarging their orchards when they do not take care of what they have: it simply increases their power of doing harm to the community by increasing their establishments for breeding all kinds of noxious insects. Every orchard that is not properly cared for is an injury to successful fruit growing.

My principle hope of a remedy for these evils lies in the direction of improved instead of enlarged crops as a means of making fruit growing a success. This has been kept well in view as far as improved varieties are concerned; but

in the direction in which I am now laboring it has thus far failed to attract much attention.

In view of the rapid increase of our old enemies, and the advent of many new ones, our prospects are not as bright as we could wish, but we have one thing to encourage us in our warfare. We have a skillful General in the field, who has been a spy in the camp of our enemies for years. He has examined and studied their fortifications, has become acquainted with their habits, and discovered their weak points, and has placed us in a position that assures us of a complete victory, if we only advance in solid column to the attack, and not waver in pushing our advantages until the victory is complete. Those that are not fully posted as to the "order of the day," or methods of attack, can obtain further information by attending the meetings of our State Pomological Society, where our General may usually be found explaining our enemies' weak points and the best methods of attack, or they can address him at the Agricultural College, Lansing, Mich. His name—Prof. A. J. Cook.

Perhaps it may be thought strange that I say little or nothing about the different methods of packing fruit and their comparative advantages. This is of little consequence in comparison with the importance of the principle that I am trying to make clear. In the first place we have to convince people that a certain course will pay best, then they will give their attention to the ways and means. For this reason I have confined myself mostly to the practical means of reducing the per cent. of expenses in marketing. Some may think that I have drawn the subject rather strong, but I have been very careful about that, for I know that I have understated many of my points. The best results claimed in the apple sales has 53 per cent net to 47 expenses. I have sold apples in Chicago that netted me 72 per cent to expenses 28.

The best results claimed in peaches was 60 per cent net, to 40 per cent expenses. My book for last season shows 67 per cent net to 33 per cent of expenses in many sales. I consider it bad policy to overstate any case, though it is very common where it is considered necessary to make a strong point; but I have as strong points as I wish, and I do not propose to weaken my position by having anything to take back.

GENERAL HINTS.

It will generally prove advantageous to sell your fruit at home when you can get a fair price, thereby saving freight, commission and risk. If you pack it yourself, put up nothing but good fruit.

Don't send your poor fruit to market, sell it at home, dry or can it, or feed it out rather than send it away. Poor fruit injures the market much more than the same amount of good, especially when there is a full supply. Remember particularly that every fruit tree set out and not properly cared for adds to your insect enemies, and increases the difficulty of raising good fruit. Don't forget that we already have too much poor fruit.

I consider this subject of the utmost importance to the fruit growers of the whole country, and if my poor effort serves to attract the attention of those better able to do it justice, I shall feel amply repaid for my labor in this direction.

Gentlemen, the world moves. Beauty and the love of the beautiful are at a premium. Beauty adds to the market value of quality and excellence. If fruit growers can be made to realize this in its full significance and act in accordance with its teachings, they will find their reward where they can count it.

After a very short discussion, in which Mr. Gulley said that Mr. Linderman's experience was always put by himself very modestly, and with no exaggeration, the meeting was entertained by the following delightful address, delivered by Henry W. Lord of Pontiac, entitled

EVERGREENS,

THEIR USES FOR ORNAMENT AND ECONOMY ON THE FARM.

In Eastern, ancient and desolate regions where there is no evergreen, but where an over wearying gray desert sand shimmers and tires the eye, the hot earth trembling beneath the scorching sun as if all the centuries that looked down from the pyramids had not yet reconciled those blistering plains to the eternal fires that descend upon them out of heaven—a colorless land where there are no brooks, no lakes or rivers, no grass, no vines, no trees; where some of God's creatures, by act of special creation, are provided with extra water tanks in their stomachs, the only sources from which they may drink during long intervals of time.

To the Oriental traveler whom sad disaster, following fast and following faster, has finally driven as a punishment for his restlessness to such a clime, that biblical figure in which Isaiah the prophet likens the refuge that sinful souls may find in the Prince of Peace, to "the shadow of a great rock in a weary land," has a graphic and startling significance that can never reach us here, wreathed as we are in flowers and fed with fruits.

"Here fragrant herbs their odors shed;
Here creeps the healing plant."

As removed from and contrasted with that land where the first act of hospitality is to offer the wayfarer, if you would entertain angels unawares, a vessel of water in which to cool his feet, here, "with verdure clad," our

"Sweet fields across the swelling flood
Stand drest in living green,
As to the Jews fair Canaan stood
While Jordan rolled between."

These distant, desolate regions which *really exist*, and in which people of the human race actually live and rear sons and daughters, have prompted and aided the imaginations of poets and writers of fiction to portray in some of their immortal works other scenes of still greater desolation, and have planted them with trees that are imperishable and yet never green.

Edgar A. Poe, in one of the saddest of his dismal songs, imagines a descent into nether regions, and, as Saint Paul said of a man he knew—whether in the body or out of the body he could not tell—who was caught up into Paradise, so Poe, whether in the body or out of the body, he could not tell, but he thought he was wandering side by side with Psyche, his soul:

"Here, once, through an alley, Titanic,
Of cypress, I roamed with my soul—
Of cypress, with Psyche, my soul.
The skies they were ashen and sober,
The leaves they were crisped and sere;
It was hard by the dim lake of Auber,
In the misty mid-region of Wier,
It was down by the dark tarn of Anber,
In the ghoul-haunted woodland of Wier."

But this is a subdued picture compared with Dante's description of the first forest discovered in his pilgrim's progress,—for you will remember that Dante's *Inferno* is a Pilgrim's Progress, something like Bunyan's, excepting that the movement is in the opposite direction. When the pilgrims, Dante and Virgil, had passed the dreadful river Styx and the three-headed dog, Cerberus, and the infernal gates with the inscriptions, they—probably contrary to their expectations—found

“That they had put themselves within a wood
That was not marked by any path whatever,
Not foliage green, but of a dusky color,
Not branches smooth, but gnarled and intertangled,
Not apple trees were there, but thorns with poison;
There do hideous harpies make their nests.”

These trees were lost souls; they had been suicides on earth, and had been planted thus to undergo eternal punishment. Every trunk, and branch, and leaf was a living member of what had been a human body. The harpies, unclean birds, offensive beyond description, and themselves immortal, came to lodge in the branches and feed upon them; every brown leaf they plucked extorted a cry of pain from the tree; and from the brown branches brown blood was dripping. Everything was brown; the air was brown; the waves under Charon's boat were brown; the waters of Lethe were brown—exceeding brown; the inscription over the gates of Hades was brown; and all the cliffs in sight were brown. Lamentations were heard on all sides. The pilgrims thought they proceeded from living creatures concealed in the trunks of the trees, and they stood bewildered.

“Therefore, the Master said, if thou break off
Some little spray from any of those trees,
The thoughts thou hast will wholly be made vain.
Then stretched I forth my hand a little forward
And plucked a branchlet off from a great thorn;
And the trunk cried: ‘Why dost thou mangle me?
‘Why dost thou rend me?
‘Hast thou no spirit of pity whatsoever?
‘Men once we were, and now are changed to trees;
‘Indeed, thy hand should be more pitiful
‘Even if souls of serpents we had been.’
So from splinter issued forth together
Both words and blood; whereat I let the tip
Fall and stood like a man who is afraid.”

While trees such as these make terrible the eternal prisons below, as poets have imagined them, so the poets also never fail to describe Paradise as abounding in trees whose foliage is perennial and ever green. And not entirely unlike the idea of Dante, who has bad souls translated as trees such as I have referred to, is the idea of the sacred psalmist David, as to good souls, when speaking, perhaps, of children and of their removal to the heavenly world after life's fitful fever here, says: “They shall grow like a cedar in Lebanon, and those that be planted in the house of the Lord shall flourish in the courts of our God.”

These celestial trees are ever green, and ever fruitful. A secular poet has described some under enchantment that “one day bloomed, and fruitful were the next;” but these that flourish in the courts of our God stand upon either side of a pure river of the water of life, and are trees of life bearing twelve manner of fruit and yielding their fruit every month, and the leaves of these

trees are for the healing of the nations. I have seen in a very old Saxon poem a description of Paradise thus translated: "Serene is the glorious plain; the sunny bower glitters; the woody grove joyously; the fruit fall not; but the bright trees ever stand green as them God hath commanded. In winter as in summer, the forest is alike hung with fruits; never fade the leaves in air, nor will flame them injure, even throughout ages, ere that an end of the world shall be. Not broken is the wood in aspect; there a holy fragrance rests o'er the pleasant land, that shall not be changed forever, until shall end His wise work of yore, He who at first created it."

In these preliminary pages I have sought by several pictures and contrasts to suggest, rather than point out particularly, the interest we should take in the woods, and the care with which we should cherish and adorn our homes with God's good gift of green trees.

Here, in this middle clime, between torrid and frozen zones, we have for a large part of the year the earth under our feet carpeted with fresh and ever changing patterns of green, studded here and there with flowers of all sweetness of fragrance and variety of hues; while over us the apple orchards bloom with prismatic and rainbow tints. The sweet maple proclaims the spring, waving in advance its crimson and scarlet boughs, so that the great forest may appear in line like an army with banners. The giant oaks, each a wood in itself, spread far-reaching arms across the highway, where the considerate woodman has been good enough to spare the tree, while in the deeper forests in summer days, over bridle-paths and lovers' lanes where young mated pairs so love to linger hand in hand,

"The woods droop darkly, as inclined to rest,
And the blue sky spreads round them like a lake
Where Piety her thirst for peace might slake."

In the villages and cities of Michigan, and indeed pretty generally throughout those of most of our States, there seems to be a love of trees for shade and ornamental purposes. Many of our beautiful towns appear almost embowered in them, so that, in some of the oldest, the streets for long distances are quite canopied over, presenting pictures of enchantment,—especially when the autumnal tints wreath them in all gorgeous coloring at the fruitful culmination of the year.

Soon these bright vestures are laid aside, and the brown winter takes sombre and sudden possession of the earth. Then the evergreens that have so modestly appeared as but cool shadows during the summer, seem to spring up from the cold ground like pyramids of light,—graceful in outline, with trailing skirts like women's robes, with aromatic breath and "a voice ever soft, gentle and low," which also, says Shakespeare, is "an excellent thing in woman."

Within the last twenty-five years evergreens have greatly multiplied, during which time many new varieties have been introduced; nurserymen have learned to propagate them cheaply, and in such a manner that they may be transplanted with certainty; so that they are within the reach of all who have grounds on which to plant them, and with taste and judgment to appreciate their beauty and usefulness. Now we cannot travel far through the country without finding here and there fine displays of them adorning and sheltering the homesteads of the farm, as well as the urban and suburban dwellings of other citizens. Joys forever, as things of beauty, they challenge and deserve admiration. The useful offices that they have the qualifications for, and stand

ready to fill, cannot be too carefully considered by the farmer especially, or neglected without great loss, both as to matters of taste and material advantage.

Some ten years ago the writer purchased of a nurseryman at Detroit 1,000 little white cedars, the *arbor vita*, one of the most graceful of our native evergreens, whether for single trees, or groups or hedges. The little plants were one year old from the seed, about four to six inches high, and cost one and one-half cents each, or \$15 per thousand. Besides planting many of these in groups or singly, about the house and grounds, a sufficient number were used to make a hedge or screen on the westerly and northerly side of a large garden, which had been very much exposed to the sweep of blasting winds, sometimes to the destruction of nearly all the early plants it contained.

These cedars, set out some two or three feet apart, all grew luxuriantly, and they now form a living wall about twelve feet high, as impervious to the winds as a brick or stone wall of equal height, affording a most complete protection for the garden, and more than doubling its value for the purposes of its use. Delicate plants that one blast of cold wind on a May morning would chill and destroy, now, no matter how bleak the gusty day, seem to nestle in the warm sunshine unconscious of harm. This is simply mentioned for illustration; we shall have occasion to refer to this kind of shelter again.

This is a cheaply obtained refuge that one may profit by, and an inexpensive ornamentation in which one may indulge.

When rough wintry tempests seem to shake the earth, when you hear them howl about your window panes, driving drear December rains clear through them, when your fires burn briskly but do not seem to warm your house, then may you reflect that had you a few years before planted your grounds thickly with a variety of evergreens in the direction whence come the prevailing storms, the trees would now overtop your dwelling and afford you a hiding place from the wind.

In this too I have had experience. More than twenty ears ago my residence was on an elevated plot of ground, that seemed to be in the special pathway of all the most enterprising winds as they came careering across the lakes. Sometimes a mile or two of fence on the farm would go down in a single night, and on one occasion especially, a neighbor's house built of brick had its whole western gable end blown in, making its way without ceremony through intervening floors to the basement.

Some years before, I had planted a score or two of evergreens in the most exposed direction. The little trees sprang up adding to their arms and strength year by year, until they were able to defy and resist the blasts, causing them to divide their columns or move on higher levels.

The farmer cannot do better for his dwelling, for his stock-yards, for his orchards and his crops than to provide a hiding place from the winds. A hiding place from the wind is associated in scripture with the shadow of a great rock in a weary land, to which I have referred.

If to the northward and westward of each farm's barns and cattle yards, a belt of evergreens were planted, they would in ten years form as complete a protection as a stone wall fifteen feet high, and be very much better in every way, affording a hiding place from the winds, which mild-eyed and sweet-breathed cows and oxen, and gentle sheep would regard as a special providence, and for which they would repay their owners many fold.

Belts of evergreens planted on the exposed sides of orchards afford such a

hiding place from the winds, that trees so protected have been observed to be fruitful when others in bleak situations have utterly failed.

I have been expected to speak, perhaps, mainly of evergreens for ornamental and decorative purposes; but I was also desired to speak of them for screens and hedging. This is an eminently practicable field. Evergreens are worthless for hedging, if by hedging is meant fencing, such as will turn cattle. Indeed they are of all others a kind of tree that cattle must not be allowed to approach: as a cow upon whose head uneasy rests her crown, will destroy a fine evergreen of more value than herself, in a very few moments, making a distaff of her horns she will spin a web of broken foliage about her, evidently taking great pleasure in the performance, proclaiming her triumph with cheers of unearthly sound, and sublime waving of tail pointed toward the zenith.

As hedges and screens, not to fence out cattle, but to fence out destroying winds, the value of the evergreen in this climate is almost beyond computation. Several times within the last twenty years, I have in the leading public prints endeavored to draw the attention of farmers to this important truth.

The winds are of great consequence, we could not live a year without them; they not only purify the atmosphere, removing "all the infections that the sun sucks up from bogs, fens, flats," but they alone move, if they do not even make the clouds. They pump up the sea, and pour it out over the mountains, and the mountains and hills thus provided form brooks and rivers to refresh the plains. The winds blow where they list, as it appears, but they are after all enlisted under a great *Commander*, and they move subject to orders that are never countermanded. They carry burdens as they cross continents, that would ten thousand times over sink all the ships that sail, and crush all the beasts of burden that ever lived. But for the winds, the Mississippi and the Amazon would have had no water, and the Oregon would never have heard the sound of its own dashings.

Like other armies, however just the cause, the winds in their raids across the country do great damage; and when we hear, especially in the very early spring, the marches of their homeless feet, beating upon the unsheltered fields, we know that the farmer's wheat is being trodden out, and that a heavier tax is being levied on his crops than any foraging party from an enemy's camp would be able to enforce in a single foray.

Against this invasion the evergreens may be marshalled, dressed on parade, and formed in line, so as to impose an invincible array. Not one of you farmers present, not even one of your wives or daughters, has failed to observe in the spring of the year when there is always more or less mourning over winter killed wheat, that even the poor protection of an open rail fence is sufficient to make a good crop for the width of two or three rods next to it, while nearly all the rest of the field is gone. It is equally noticeable that a belt of timber to the westward of an enclosure will afford complete protection to a forty acre field of growing wheat.

The loss to Michigan farmers by the winter-killing of wheat and clover is enough in the average length of a working life to make a little fortune for each if it could be saved. Michigan raised in 1874, 15,500,000 bushels of wheat and 1,134,000 tons of hay. Now if the damage by winter-killing, taking one year with another, is equal to one-fifth part of the crop, and I believe it to be much more, then the loss of money annually is, estimating wheat at \$1.00 per bushel, and hay at \$7.00 per ton, \$4,687,600 to the agriculturists of the State.

If in the place of our fences all the roadsides and the dividing lines between all fields, or division of ownership were lined with rows of evergreens 20 to 50 feet high, it is probable that we should hear no more of winter-killed wheat, or very little. The expense would be small in the first instance compared with fencing: ten evergreens to the rod would be sufficient, and would cost fifteen cents, the labor of planting about as much more.

But how about the cattle? Well, that is a question of considerable magnitude. It is our opinion that they should never be allowed to leave the enclosures provided for them about the barns and sheds. It is not likely that many here will live to see the day, yet we believe it to be not far distant, when there will be no fences in Michigan except those provided to keep animals away from the fields, rather than to confine them in them. Farmers themselves, severely as they feel the weight of their expenses for fences, are, as a rule, unaware of the enormous burden of them, and how much it costs to perpetuate the incumbrance.

I have taken some pains to ascertain the weight of this load, as it rests upon a single township, which may be Troy, or Farmington, or Oxford, or any other, so that it is in an old settled part of the State, and is six miles square, with its thirty-six sections of land.

In such a township there are 23,040 acres, which is divided into 288 lots of 80 acres each. If we suppose one-half of these lots are under fence, that is 144 of them, which is I think much below the real number, and if these are cross-fenced into twenty acre lots, which also includes the idea of much less fencing than is actually used, then we find that at \$1.25 per rod for board fence it will cost \$900 for each eighty acre lot. I am, of course supposing that the original rail fences are going out, as is the case in the older towns, and the board fences must replace them. The 144 lots thus fenced will cost at \$900 each, \$129,600.00.

The interest on this money at 7 per cent, is.....	\$9,072 00
Repairs annually as much more.....	9,072 00
Fencing will not last more than 20 years, therefore add 1-20th annually for wear.....	6,480 00
Making the cost per year.....	<u>\$24,624 00</u>

Now as the only use of these fences is to restrain cattle, let us see how many cattle the farmer will have to keep at a profit of ten per cent. above all cost in money, labor, and feed to meet this expense. We find that the annual cost of his fences in the one township supposed, \$24,624.00, is ten per cent upon \$246,240.00 worth of stock, this would make it necessary to have

1,000 horses at \$100.00 each.....	\$100,000 00
4,000 cattle at \$25 each.....	100,000 00
15,413 sheep at \$3 each.....	46,240 00
	<u>\$246,240 00</u>

Seven horses, 28 cattle and 107 sheep to each eighty acre lot, a clear profit of ten per cent. on which must be made to pay for the fences alone each year. If it shall be said that farmers do not raise stock for so small a profit as ten per cent. clear, it may be also said that sometimes they don't get as much, and that it is also true that I have given them credit for much more stock than they

keep. After making the above calculation I was at the trouble to ascertain just how much they do keep, and I find that in 1874 the town of Troy, one of the wealthiest in the county, had 786 horses over one year old, 1,364 cattle, 5,163 sheep, or about two-thirds the number of horses in the above estimate: about one-third the number of cattle, and one-third the number of sheep, while the average of the county of Oakland is about one-half the number of horses, one-third the number of sheep, and one-fourth the number of cattle. So that if the farmer works according to the census, he has to make, even in Troy, thirty per cent clear on his stock to pay for his fences, and in this county on the average more than fifty per cent.

When these truths shall be thoroughly appreciated, and the further truth that every three acres will sustain as much stock in the yard as five acres will in the field, then farmers will begin to inquire if fences cannot be dispensed with, and when they shall realize how destructive to crops it is, to let the winds go wholly at large, then they will begin not only to decorate and adorn their homes and gardens with evergreens, but will extend them along the highways, and make landmarks of them between all their neighboring possessions and properties; then the lands will all be ornamental grounds and their gardens extended over the whole of the farm, and the Paradise lost will appear to have been in a measure regained.

For ornamental purposes, on lawns, or near houses, evergreens should be planted in considerable variety, as in their different forms and tints of foliage they contrast with and show off each other; one kind adding beauty to another, massing their combined attractions to glorify the landscape.

Their lower limbs and branches should sweep the ground always, and in pruning an upper branch should never be allowed to extend beyond a lower one, but rather be cut a little shorter, else the lower limb will inevitably begin to suffer for want of light and in time decay and fall off.

A fine Norway spruce or dark Austrian pine or arbor vitæ, with its flowing branches like flowing robes spread out on the ground and gradually gathered in as they ascend until the topmost spray sways in the air alone, like a pencil of waving light, is certainly an object of surpassing beauty. So is a graceful woman in full dress on the lawn beside the tree. For myself, I like the latter the best; but cut away, as many do, the evergreen branches a few feet from the ground and cut off the lady's skirts at the knee, and while both the tree and the woman will have something left of beauty and interest, and will still be worth having, yet they will not after that, either of them, represent the Graces.

Care should be taken to place evergreens and other shade trees not only where you want them, but also where you would like to have them stand when they shall have had time to grow a few years. Many do not realize how large a space an evergreen or a maple twenty years old requires. For instance, I saw a few days ago in one of the interior cities of this State, two as fine specimens of Norway spruce as one often sees. Each occupied a circular space of about twenty-five feet in diameter. They had been placed there probably when not more than three feet high (they are now about thirty feet high) in front of a cheaply built little cottage, standing back about twenty-five feet from the street. The result is that they occupy the whole space in front of the house; both the upper and the lower windows are completely walled up with them, and the front door, which opens between them, is entirely invisible from the gate, and almost inaccessible. Now what is to be done? To cut away the lower branches so that

the occupants could see out under those left would be worse than murder; besides, to relieve the chamber windows the upper branches would also have to be cut off. To be sure the trees might be cut down altogether, but that would not do, because the trees are worth more than the house, and so beautiful are they that the property would sell for more money with the trees on it without the house than with the house on it without the trees. There seems to be no way therefore except to remove the house.

Farmers are not so likely to make such a mistake, because in the ample grounds about their houses there is less temptation to it, but there is no city or village of any size probably in the State, where you will not find more or less instances in some degree such as I have described. Large open spaces should be left immediately next the building; you don't want your house shaded nor your windows shut out. You want pleasant shade near by, but not on your dwelling, it is unpleasant to have it, and it is unhealthy.

In your affiliation as agriculturists you have chosen from old song and story some beautiful names to grace your organizations. You did not select them from among interesting characters in holy writ, though there are many among them that would have been well adapted.

There was Martha, whom with her sister Mary, Jesus loved, and loved to visit. Careful about many things, she would have been a good representative personage for the divinity that should preside over all the cares and comforts of the household and home.

For a goddess of music there was Miriam or Deborah, whose grand anthems will echo through all the corridors of time. There was Ruth, also, who presents one of the sweetest pictures among the sheaves, or on the threshing floor, that ever poet imagined. She would have been admirable for the goddess of all the harvest; but I suppose the real difficulty in selecting scriptural names resulted from the fact that a natural fitness of things would have made it necessary, if you resorted to biblical characters at all, that you should begin with our sweet mother Eve, most beautiful among all that have lived; but unfortunately Eve was not a pomological success, so you of the Grange had to resort to the beautiful heathen mythology of the Greeks, and adopted Pomona, the charming goddess of all the fruits, and Ceres, said by some to have been the mother of all the earth, but generally regarded as the special protectress of the golden grain. Then from the same bright galaxy of immortals you selected Flora, fair goddess of the flowers. I believe this completes the celestial choir whose names I have seen invoked by the Grange or whose memory is cherished by the appointment of representatives of them from among the fair daughters of our rural associates and fellow laborers.

Let me in all love and modesty propose that another illustrious name from the same ancient group of divinities be added to your allegorical deities—*Silvia*, goddess of the trees and the wood, and to whom all sylvan scenes are dedicated and from her named.

Let *Silvia* be announced and acknowledged with proper ceremonies, and as you shall become devoted to her, evergreens and other trees will adorn your dwellings and border and shelter all your fields.

Permit me in closing this paper, which I fear has been rather a trespass upon your time, to express my admiration of that feature in the progress of the age, which has led those who live by the orchard and the Grange to organize for the purpose of adding beauty and loveliness, as well as profit to agricultural pursuits. At the marriage feast of sturdy labor and sweet good taste, I

bless the bans, and pray, after my poor fashion of reading prayers, "that your sons may be as plants grown up in their youth: that your daughters may be as corner stones polished after the similitude of a palace; that your garners may be full, affording all manner of store, that your sheep may bring forth thousands and tens of thousands; that your oxen may be strong to labor, that there be no breaking in, nor going out, that there be no complaining among you; for happy is that people that is in such a case, yea happy is that people whose God is the Lord."

Mr. Moody, of Lockport, a member of the Western New York Horticultural Society, made a few remarks upon the subject of the paper just given. Among other things he said that there was nothing that interested him more than the question of the employment of evergreens for embellishment and for screens. He believed we would see the day when our roads would be lined with evergreens and our farms crossed by them. Pasturing in most localities, he thought, was beginning to be felt as poor economy, so that fences for barriers to cattle could be replaced by lines of evergreens, which would be a great protection from the winds that sweep with such energy over our denuded country. He felt that as a matter of wise economy this must be adopted quite generally. He gave the example of his own farm, where he had planted rows of evergreens once in thirty rods, and was reaping the benefits already.

Mrs. A. E. Green, of Farmington, Oakland county, gave the next paper upon

FLOWER GARDENING AS A HOME ACCOMPANIMENT.

It may surprise some, that in the season of snow, we should speak of flowers. But the sweet blossoms which always seem to come fresh from the Creator's hands are just as welcome to the lover of the beautiful in one season as another. Besides if we cannot have flowers in the garden, we can have flowers in the parlor.

To make home cheerful indoors during the long winters of the north, there is nothing that compares with flowering plants. They are a constant delight. Each day brings out new leaves, and buds, and blossoms, and new forms of loveliness. With house-plants as with all other things, success is essential to enjoyment. There is pleasure in having plants as much as possible the work of our own skill, grown from seeds and cuttings, and trained by ourselves. We will endeavor to give a few suggestions that may be useful to some. We do not propose to instruct those who have greenhouses, but to give (as we have been solicited), our own experience.

Plants, like ourselves, need air, light, warmth, food, and drink. Where good earth is used in potting plants they seldom need any other fertilizer. The best soil for plants is found in old meadows. A pile of sods laid up to rot make excellent potting earth. Nearly all plants will grow in earth from the woods, or very rich sandy soil, or even in sand with any good fertilizer and well watered.

Azalias, begonias, cacti, calla lilies, camellias, fuchsias, dracenas, daphnes (kept wet), with geraniums, jessamines, justicias, myrtles, oxalis, oleanders, passifloras, these with Bengal and Tea roses, will make an ample variety for three or four windows, and offer bloom the whole season.

Plants should never be watered while the rays of the sun are pouring directly

upon them. Administer tepid water copiously. Turn out all water which has soaked through and accumulated. Most plants are injured by standing in water. Hydrangeas, calla lilies, and lobelias are exceptions to this rule. Plants which are blossoming vigorously require more water than those that are not so healthy. One thing must be borne in mind primarily: never pour cold water on roots or leaves of plants. Let it be warm enough to admit the hand, but never hot. Cold tea benefits plants if not used too frequently and cold.

I think the most important point in plant growing is the watering. Some say never water a plant unless dry. This is shown by tapping the pot,—if dry it will sound hollow, then water thoroughly, a soaking or none at all. A copious supply of water, frequent syringing of the foliage, and a judicious airing will result in success. All plants kept in a room should be washed twice a month, and sometimes oftener, to insure a more healthy growth. Ivies are benefited by washing them, when the leaves get dusty, with a soft sponge. Another injury to plants is to leave on all dead or decayed leaves and blossoms. This should not be permitted, they should be removed as soon as they show symptoms of decay. It is commonly thought that coal gas injures plants; possibly there may be some truth in the supposition, but I understand that it is used much in England where they have such marvels in indoor gardening. I think it is evidently a fact that it is not the gas alone, but the effect of the gas combined with the closeness of the room and the heat and unhealthy condition of the indoor atmosphere. Some of our bulbs, hyacinths for instance, grow under the snow and flower in early spring before the warm days of summer.

To expect them to thrive in a temperature as dry and almost as hot as Sahara, and very much closer, is obviously unreasonable, aside from the gas question. The hyacinth and crocus, and most other bulbous roots, should be grown in rooms that are usually kept cool, but some other plants will stand more heat. Heat, light and ventilation are required for thrift. Bulbs planted in plates filled with sand and covered with moss, or planted in pots nearly filled with earth, do not require to be kept in the dark at first, though it will do them no harm. The bulbs being covered with the earth and moss are dark enough, and are in a natural condition for growing. The one essential of window gardening is sunlight. That secured, the rest is easy. A south window with a shade that can be raised or lowered at pleasure is best. Hardy bloomers such as fuchsias, tea roses, geraniums, etc., do better in the house as a general thing than tropical ferns which are so temptingly beautiful in conservatories and perish so quickly out of them. A few foliage plants, also a coleus or two,—and who would do without the myrtle?

It is a common thing to put plants into too large pots. This has a bad effect. To be sure if the soil is good, and not over watered, the plant will grow rapidly, but it will produce leaves instead of flowers, and if it is over-watered the soil around the roots has the same effect as the stagnant water in the saucer. In repotting plants never give too large a shift. Plants should be repotted, when the roots around the outside of the mould look white, then the plant should be transferred to a pot one size larger. By persevering in this mode of treatment for some time, and never advancing more than one size at a time, the plant may be grown to a large size, and made to produce an abundance of flowers, while by suffering it to remain in a smaller pot, or changing it to a very large one, the stem will become weak and elongated, and the flowers will be few.

Plants crave the air as much as our human lungs, it is vital to their growth,

but care must be taken never to raise a window upon your plants in cold weather, a draught of air is a great injury to them.

I have treated at length of flowers as an indoor accompaniment. We have our flower gardens as an outside accompaniment, and flowers of an almost infinite variety. And is it not less wonderful that their regular succession equally displays the wisdom and benevolence of the Creator? Had there been exact and unvarying uniformity in forms, color and fragrance of flowers, we should soon have been tired of such dull monotonous uniformity. Should the summer only reproduce the flowers which adorn the spring, we should not only be weary of contemplating them, but we should be much inclined to neglect and not bestow that care upon them which their successful cultivation requires. If contrary to the analogy of nature, uniformity, fixed and unvarying, had been the law of the floral kingdom, it had not displayed such countless beauties, and reflected everywhere, the glory of divine perfection, in such dazzling radiance as it now does. In no country is the cultivation of flowers making such wonderful progress as ours. Much can be done to make home happy and cheerful, all through the season, especially if our home yard furnishes an abundance of flowers for floral decorations.

The first thing in home adornment connected with the flower garden (if it be properly drained) is laying out our grounds. This, however, is only a matter of taste. Much might be said, and many suggestions made on this subject, but for want of time I leave it. Next in importance, the soil must be good and well prepared for germination. The earth should be rich, mellow, and free from lumps. Different soil will produce different grades of the same family, for instance, dahlias that we put out last season in a clay subsoil covered with sand grew to be over seven feet tall, the stalks large, with an abundance of foliage. The flowers were small and long maturing, while tubers of the same were put into a gravelly loam grew two feet, and were literally covered with blossoms that were large, compact, and models of perfection.

Sow good seed, and those that will afford bloom the entire season. Our home garden is a plot of ground, clay subsoil, that had been plowed ten inches deep and seeded down, having a good turf. It was then covered eighteen inches with a clay subsoil scraped from a cellar, this covered with muck from low swamp land, and the whole covered with sand about six inches, and has an under drain, and on this we make almost every floral variety grow with scarcely any other fertilizer. Some think shrubs an injury to a home garden, but we spare the shrubs, they lend fragrance to the breeze and beauty to the garden, and they afford shelter for the small plants from the scorching rays of the mid-summer sun. A few is all that is required: it would be folly to make a nursery of our flower garden. There is no business or profession that requires more skill than growing choice seeds or cuttings. There is a constant tendency to degenerate. This should be guarded against. Single or poor flowers produce the best seed. Scarcely are our winter frosts gone before the crocus puts forth its buds and blossoms. Then follow in close succession the tulip, the hyacinth, and violet, with all their beauty and fragrance. Then our annuals, of which verbenas, dianthus, abronia, etc., with the beautiful pansy are examples. These last should be grown in the shade. Then phlox drummondii, positively unequalled by anything with which I am acquainted, yet comparatively little known or appreciated. Generally showy plants are not delicate, but the phlox is both showy and delicate. It presents innumerable combinations of color, every shade as the groundwork of the petals, and every color and union

of colors in the eye. For a brilliant effect it is unsurpassed. There are many varieties of flowers that are self sown, and germinate uninvited, that crop out in unexpected places with such cheerful courage that few have the hardihood to expel them, and they crowd out other varieties. The aster genus is exceedingly numerous in species, comprising all the colors of the rainbow, and deriving its name from its radiating appearance. Its popularity is increasing, and for an autumn show it is almost unequalled. But we are apt to get enthusiastic over any special favorite and proclaim its wonders abroad. Of this family many species are enumerated. For variety may be sown lobelia, mignonnette, candy-tuft, and hosts of others too numerous to mention. Then a very common plant in most farm gardens, the stem erect and branching with lance ovate leaves, flowers solitary, red, white, and pink, and good for winter drying, is the globe amaranth. Then there are petunias of every variety, and those arrant truants the portulaccas, no sunny fence side being too hot for them, they glow there like bits of shattered rainbow.

Althea rosea is too well known to need description. Its flowers are much admired by some, and it presents to the eye brilliant colors of every hue. So we might enumerate. We have balsams and zinnias, all favorite exotics of the flower garden; then perennials and biennials, with carnations and delphiniums, and in each flower there is something original, something to distinguish it from every other one, even of the same family. Each individual flower has its peculiar characteristics, and is adorned with a beauty and grace peculiarly its own. In a group of flowers there is a resemblance to show that they are one family, yet each one of whom is distinguished from the other by some peculiar charm. In all the floral kingdom we cannot find two flowers exactly alike in form and color. Let me, therefore, entreat you to encourage their culture as well as study their forms and beauty. Endeavor to surround your dwelling with twining vines or graceful climbing plants, remembering that there is no place so rude as not to be refined by their presence, and none so adorned as not to be graced by their beauty and fragrance.

Mr. Thomas.—I am a very plain man, and perhaps most of you would not think from a gaze at my exterior that I am a passionate lover of flowers, but there is nothing in which I take greater delight, and from a long experience in farm life I can say that although I have given a great many hours to the cultivation of flowers, the time thus spent has been by no means lost. I am no poorer for my flower garden. I am richer in all that makes my life worth living for. And when any man excuses himself from assisting his wife and children to arrange a flower garden, or borders of annuals in the lawn, because he has no time for such foolish things, I set him down as one who does not take any broad ground in matters of real economy. I look upon economy as something that applies to more than a man's pocket-book, it looks to the health and happiness of his family, and it is my conviction that there is nothing connected with farm life that has more elements of true economy in it than the plan of spending time and thought among the flowers. I do not mean that large amounts of money shall be expended for novelties, and varieties, but I refer to the plain common plants and flowers that cost little save care, and attention and affection, which give an abundance of bloom that can be transferred to the house to give life and beauty to the loneliest hours, and make home more attractive and pleasant.

Early in the proceedings of this meeting in the appointment of committees one was selected to report upon "other things" than apples. This committee being ready to report, Mr. Whitney, chairman, read the following:

Mr. President and Ladies and Gentlemen:

Your committee on Other Things has given the various matters under this head due consideration, and would humbly beg leave to submit the following report, hoping that, while it is neither comprehensive nor exhaustive, it may serve to develop thought and investigation in this and many other things. We begin with

FLOWERS.

We find on exhibition a few fine specimens of the *Primula sinensis*, by John S. Crawford, of Pontiac. The specimens are well grown and unusually well flowered. The white all-white Chinese primrose is one of the best of all the primroses but unfortunately is high in value, because it can rarely be grown from seed, and with difficulty and but slowly from cuttings. Many new varieties of this class are known to florists. One, the new John Saul, sells at \$2 and upwards for fine plants. Small plants of the more common of the class command from \$30 to \$50 per hundred. The pink variety and many better ones are easily grown from seed when the needed care is given to planting, shading, watering, etc., but they may be bought at prices ranging from \$10 to \$20 per hundred. For winter blooming no plants succeed better than the various sorts of *Primula*. Your committee can only wish that they might have had more such "other things" to report upon.

PEARS

next claim a space in our report. Three varieties are upon exhibition. One plate of Vicar of Winkfield is shown by Mr. Drake, of Southfield. This pear is a little past its prime, yet we could only wish they were more in number and size. Two varieties, of one specimen each, of the Fox Seedling are upon exhibition, brought by Mr. Adams from the Rochester meeting. These were grown by Barnard S. Fox, of San Jose, California, who sent sixty-five varieties to the American Pomological Society, at the Chicago meeting, and were furnished by Messrs. Ellwanger & Barry, Rochester, N. Y. The largest pear is named the Barry, in honor of Patrick Barry, the eminent pomologist of Rochester, N. Y. Although far past its prime, and having passed through the transportation and exhibition, this pear gives evidence of good quality and would command a fair price anywhere, and if it proves a productive variety and can be acclimated and retain all its good qualities, we ought to hail its advent. The Wilder, named for Marshall P. Wilder, of the American Pomological Society, is of firm texture and is very sweet, and will make a good market variety. Further developments and trial will settle many questions in regard to these pears.

TWO PLATES OF GRAPES

are shown by L. C. Whiting, of East Saginaw. One sample is the Diana, and the other the Clinton, both fair samples, that had been kept by putting them in a stone crock and setting it in the ground beneath the frost. They were picked when perfectly dry, and packed in layers with dry, soft paper between.

CANNED FRUITS.

Fine specimens of cherries, whortleberries, strawberries, peaches, and maple syrup in cans are shown by Edwin Phelps, of Pontiac, and Mr. W. Beatty has canned raspberries, peaches, crab apples, all good of their kind. Fine specimens of dried fruit by the Williams process are shown, to which we only need invite your attention.

CIDER.

Fruit in liquid form—from previous pressing, and not a little worked in spite of efforts to the contrary, and shown and called *cider* by the label. But it was not such as we used, when boys, to draw through the lengthened tube whose first service was to hold up wheat and rye, nor such as we used to extract from beneath the bruised skin of an apple. Now we think of it, it is unfortunate the cider is classed as “other things,” as all your committee are G. T.’s, and not J. T.’s, and so cannot appreciate the fine qualities and powers of the articles on exhibition, but by a little strategy we have been able to judge that the quality of all these specimens is good,—each, perhaps, having particular friends, as, at every recess, the quantity of each has lessened, making friends cheerful and willing to aid us in making out this report; hence we say that C. W. Benjamin, of Pontiac, has a good article, with age, body, and high color. The Pontiac Cider-mill Company has an excellent specimen made by the cloth straining process, while A. N. Gable, of Pontiac, shows a good quality of cider wine.

THE LAST AMONG OTHER THINGS

on exhibition is a specimen of hen fruit. This puts your committee in fault. The exhibitor don’t say whether it is a vegetable or an animal product. If the fruit of the egg plant, of what variety; if animal, then with the present raging “hen-fever” we should know whether of the Asiatic, Polish, French, English, or game breeds; then we should need to look for the number of toes, the plumage upon the body and legs, examine the hackles, comb, grills, etc., but being without data upon this subject, your committee leave each person free to look up the matter for himself.

C. L. WHITNEY,
A. G. GULLEY,
WM. CALDWELL,
Committee.

The special committee to report resolutions upon the loss of certain members of the society by death, made the following report:

WHEREAS, During the past year John Gilbert, of Ovid, Judge Monroe, of South Haven, William Bort, of Niles, and Henry Seymour, of Grand Rapids, four prominent members of our society, have been removed by death,

Resolved, That we hereby express our profound sorrow, and extend our heartfelt sympathy to the relatives of the deceased.

Resolved, That our Secretary be instructed to forward a copy of these resolutions to the immediate relatives, together with a copy of our next annual report, containing the following more extended notice written by our former Secretary, J. P. Thompson.

“I was hoping to be present when the convention was bearing testimony to the virtues of our lately deceased venerable brother, Mr. John Gilbert, of Ovid,

Clinton county. The announcement of his death did not surprise us. He was an old man full of years and of honors, and after a long life of usefulness he goes to his rest, leaving behind a long roll of friends who mourn his loss, while they admire his honorable course of life, illustrated as it was with so many of the virtues that dignify an upright manhood. He was one of the most honored members of our society, his kindly, genial face was always hailed with a hearty welcome at our fairs. No better fruit grower (especially of apples), was there anywhere. His exhibits were always beautiful, and always commanded the admiration of judges as well as of spectators at the fairs. I first met him at Grand Rapids in 1873, again in 1874, at East Saginaw, where his fruit was wonderfully fair, solid and showy. He was always pleasant, had a good kind word for us all, and his greeting was that of a father blessing his children. In 1874 I said to him, 'Mr. Gilbert, we hope to meet you again next year.' 'Ah, my friend,' said he, 'I doubt it, I am an old man. My days for fairs and shows are over. I think this is my last State Fair,' and the tears started from the old man's eyes, 'but,' said he, 'friend Thompson, don't forget to send me the life membership certificate to which I am entitled, for I always want to help the society a little every year, living or dead.' In 1875 I looked for the large display usually made by our old and loved friend Gilbert, but it was not there. He brought a few plates, and said: 'My friend, I could not keep away, I wanted to see you all; but it is my last State Fair.' He spoke solemnly but truly. We looked to see his white locks at Jackson in '76, but he did not come. And the veteran and pioneer fruit grower is dead, but his memory liveth and should live in our society. The fragrance of the orchard when in bloom surrounds the life and death of John Gilbert."

"Another pioneer of the State, a life member of our society, has passed on to the other more glorious life, and we should cherish his memory, for he was a good friend of ours, as he was a good friend to all similar enterprises. Judge Munroe, of South Haven, saw Van Buren county when it was a wilderness, and lived long enough to see it blossoming like the rose. He was a man who was a part of all this growth, progress, and improvement. I met him first at the meeting in South Haven, when he came forward, quietly and privately, saying: 'Here is ten dollars; that makes a life member; I want to help your society, for I have tried to help them all, and yours is the youngest. I believe in them all. I want to see them all sustained. I am an old man and cannot work much, but I want to belong to your society.' Judge Munroe was, also, one of the first members of the State Agricultural Society. In 1849 he attended the first meeting, at Detroit, to perfect measures for the first State fair held in the State, and I learn from our Brother Holmes that it was Judge Munroe who first proposed the business committee of that society. Said he to Secretary Holmes: 'It is not convenient for our western members to come to Detroit every time you want a meeting; now appoint a committee to arrange and provide for the fair.' It was so ordered, and this committee was called the 'business committee.' He was first and foremost in many good works, and no man was more honored and respected in Van Buren county.

"South of Van Buren county, at Niles, we have lost another friend. Wm. Bort was a man of great proficiency as a horticulturist in its broadest sense. Though of local and provincial reputation, our State has possessed but few who could equal him in his professional attainments. He was a plant-grower of rare skill. He did much to create a taste for fruit culture in Berrien county. He died in the prime of manhood, lamented by the entire community among

whom he had lived for years, universally loved and respected. At one time he was a most useful member of the executive committee of the State Agricultural Society.

"I met him first at our dedication meeting at South Haven, when his marked intelligence, modesty, and kindness of heart, made a deep impression upon all who came in contact with him. We all saw at once that he was a master among fruits. His death made a profound impression where he was known.

"This society mourns his loss with his numerous friends in the southwestern section of the State.

"I feel as if some reference should be made to the death of the late treasurer of this society, Hon. Henry Seymour. His last days were clouded with the deep gloom of pain and suffering, but through it all he was patient, calm, and uncomplaining. I notice that the death of but few men in the Grand river valley has called out through the press more touching and affectionate tributes of respect and sympathy. He came to Grand Rapids in 1842, and since that day, for 35 years, he has held a place in public esteem granted to but few. He represented the people of his county in both Senate and House. He loved rural life and the things of the country, and this taste always brought him prominently in connection with the horticultural and agricultural affairs of his county. He was always active at the county fairs, continuously did service in some capacity. Brought in frequent contact with him while he was treasurer, I always found him courteous, kind, correct in his accounts, and I believe that he was a man of unvarying integrity. He was the kindest of parents, and his wife and children clung to him with the tenderest affection. Though dead he liveth in many hearts.

"J. P. THOMPSON."

Respectfully submitted.

W. J. BEAL,
C. N. MERRIMAN,
N. CHILSON,
Committee.

KEEPING GRAPES.

The following letter was read from E. F. Guild of Saginaw, on his method of preserving grapes for a long season:

To the President of the State Pomological Society:

The grapes should be picked on a dry day when there is no moisture on the fruit, and placed in stone jars in layers, care being taken not to break the skin or in any way bruise or injure any of the berries. Alternate the layers between with soft paper or any other material that will absorb the moisture and keep the fruit dry. Dig a trench in any dry ground where the water does not stand in the soil, about six or eight inches deeper than the crock, put the crocks in a trench and cover with a board or stone, cover loosely, taking care not to cover too tight. Cover with earth and let them remain until the ground begins to freeze. When the ground has frozen to the depth of four or five inches, some mulch, coarse manure or any material should be put on the ground to prevent the frost from penetrating any deeper, the main object being to keep the fruit at as even a temperature as possible. They can be taken up at any time before the frost goes out of the ground.

If they are buried six or seven feet beneath the surface they can be kept until grapes come again. The above method is so simple that any person can have grapes as fresh as when picked from the vine at any time during the year.

THE MANN APPLE.

Mr. Elisha Moody of Lockport, who had previously sent on samples of the Mann Apple for exhibition at this meeting, then gave a short talk about the apple as follows:

The description of the Mann Apple will be found in the appendix to Downing's Fruit and Fruit Trees of America, and runs like this: "Tree hardy, an upright grower, with rather slender branches, forming a round head; an early and annual bearer, a late keeper, valuable for market and cooking, and a fair table fruit. Fruit medium to large, roundish oblate, nearly regular; skin deep yellow when fully ripe, often with a shade of brownish red when exposed, and thickly sprinkled with light and gray dots, a few being areole; stalks short, rather small; cavity medium or quite large, sometimes slightly russeted; calyx generally closed; basin rather large, slightly corrugated; flesh yellowish, half fine, half tender, juicy, mild, pleasant subacid; good to very good; core medium. January, April." I might add to this description that it keeps as well as the Roxbury Russet.

We believe that the apple was once known as the "Deiltz" apple. We were about the first to propagate it, and as we obtained our scions from Dr. Mann of our county (Niagara), we have always called it the "Mann Apple," by which name it is now known.

We sent some of the trees to Missouri several years ago, and we are informed that they have not been injured in the least by the unusual cold winters of the past few years. A nurseryman there writes us that he thinks it more hardy than the Duchess of Oldenburg.

Wednesday Evening.

The session opened with some questions put to Mr. Moody, which elicited a little more information upon the Mann apple. He considered it a great acquisition. Specimens were shown and tested by interested members, and the apple was pronounced all that it was recommended.

Prof. Ingersoll of the State Agricultural College then gave an address, which was listened to with great interest upon

ORCHARD DRAINAGE AND CULTIVATION.

It may seem somewhat out of place to speak of orchard drainage to an audience in a portion of our State where but little of the soil needs artificial drainage, and especially where such a display of fine fruits is made and most of them raised on undrained lands. But because you have thus succeeded in favored localities and under favorable circumstances, do not flatter yourselves that such work is superfluous and unnecessary.

Many of you are aware that large portions of our State need drainage of some kind before the farmer can raise crops successfully: that there are many

farms in the counties of Macomb, Wayne, St. Clair, Livingston, Shiawassee, where a man would be at a loss where to place his orchard if he had any regard for the life, health and prosperity of his trees.

There are many more that it is desirable to have the orchard placed in a certain location on the farm, but the soil is too low and wet; and yet we see farmers wasting money year by year in such places by buying and setting trees in places where trees will almost absolutely refuse to grow, or if they live make but a sickly, pinched growth, and they laboring in vain to keep the vacant places full. It sometimes seems as if men use good judgment in every direction but this.

But let us look this question squarely in the face, and see what is to be gained, if anything, by orchard drainage, and *first*, let us look at the influence on the land and crops.

Almost every farmer has some general idea that thorough drainage of land is beneficial; but if one has never seen the effect produced by the drainage of some low, wet piece of ground by drains thirty feet apart, and three and a half to four feet deep, he will be more than surprised. It will seem as if some fairy with magic wand has touched it with a charm, and lo! where only sedges and wild grasses, ferns and flags could grow, we now see fields of waving corn or grains, meadows of beautiful grass, and all brought about through the agency of drainage. And here let me say that much more of our land would be benefited by drainage than most farmers imagine.

If your lands are not ready to work in thirty-six to forty-eight hours after severe rains you had better introduce drains at once.

You may, perhaps, get frightened at the amount of water taken from the field, and fear for the time of drought, but here you will be doubly surprised for the crop over the drains will stand the dry weather better than the other, from the greater capillarity of the soil superinduced by the taking away of the water before hand.

The first benefit I notice, then, in regard to the soil is its greater porosity, by which the field is made more pulverulent, easy to work; and at the same time the soil aerified, that is, the water is rapidly taken from the soil, and the air fills the interstices and induces capillarity when the dry weather comes on. You are all familiar with the puddling of the soil that takes place where water has stood and evaporated, so that the soil seems baked and compact in such hollows, while on the ridges the soil is much more loose and porous, though of the same texture. The drains make the whole even better than the ridges.

Second, the greater warmth and quickness of the soil. Most of you are aware that evaporation is a cooling process; that to keep cool in the long summer days, we sprinkle our floors thoroughly with water, and the heat is absorbed in the effort to convert the water into vapor, and thus the temperature in that immediate vicinity is lowered.

You have but to transfer this process to your fields and you can understand why it is that wet fields are always cold, and why vegetation grows more slowly there. Also why these fields are liable to late spring frosts and early ones in the fall. But take away the water by drains and you avoid the large amount of evaporation necessary to make the field tillable. You can often gain ten to twelve days of time in the spring, and nearly as much more in the fall, and thus make a crop which would otherwise be lost by frost.

But why speak of the crops in an address on orchard drainage? We answer, because farmers generally crop their land when the orchard is young, as a

means to cultivate the trees, and raise something so as not to lose entirely the use of the land while waiting for the fruit. It would be much better to cultivate the ground with no crop but the fruit trees, and direct our whole energy and attention in that field to that alone. But we must take things as we find them. Ninety-nine out of every one hundred men do crop their orchards. If, then, these men can increase their crops by the drainage of the fields so as to pay for the cost of drainage while they are waiting for returns from their fruit trees, the benefits the trees receive will be gratuitous.

But does drainage so pay? In a late number of the *Country Gentleman* was the report of a convention of farmers in Ohio at which the subject of thorough drainage was discussed. Several men gave their experience in regard to it. Two or three said they were paid by the second crop. Several others were confident that they were paid for all the time, trouble, and expense by the first four crops.

Now if drainage will so increase the capacity of the land to produce so that a man can pay for his drains from the increased produce in seven years (at which time his orchard will begin to bear), he has made a capital investment.

A writer in rural affairs says that in his own experience drains paid for themselves in increased productiveness in three years, and that, too, on land that superficial observers would say needed no draining. *We will notice, then, secondly*

THE EFFECT OF DRAINAGE ON FRUIT TREES.

We will take as our first position, then, that trees should have a steady growth. Too frequently has it been in the past that fine trees have been obtained from the nursery, set comparatively well, started vigorously for two or three years, and then suddenly appear checked in growth, the result of the roots having appropriated the available space, and the after growth to be made by thrusting the roots into cold stagnant water, or into soil saturated with water. It is now pretty generally known that crops will not thrive in such places, and people should think that trees, and especially fruit trees, need to have care exercised in this direction.

There are various theories in regard to this, but it is not our purpose to enter into a discussion on that point. Lindley says that "no person has seen good fruit produced by trees grown in lands imperfectly drained."

I have but to present you an example of the apple orchard of the College farm, which was nearly at a standstill as regards growth and fruit, until it was drained by putting a two-inch tile between each row of trees at a depth of three to four feet, and the trouble was entirely remedied. The trees sprung into luxuriant growth, and also fruited well. They have done more in two years since drainage than in five years before.

This brings us to the second position, which is that drainage makes trees healthy. We think of this perhaps when we put out an orchard, but stop all efforts in that direction immediately after,—*i. e.* we take care perhaps in setting trees, to look after the roots, and perhaps manure, mulch, and water the first year, and then leave the trees to take care of themselves after that. The result is that they make a year or two of good growth. The farmer then wants to seed down his field, and does so to the detriment of his orchard. He should keep a steady growth for health by first draining his land to the depth of four to five feet, then he should cultivate his field in such crops as will best promote

the interests of the trees, and make everything done with that field look primarily to the prosperity of his trees, and secondarily to other things.

The man who would treat his animals in the way he treats his orchard would not expect any adequate returns or many compliments from his neighbors as to the fineness of his herd. He recognizes the fact that he must give his animals constant feed, care, and attention in order to have them thrive,—that to get the best results he must have a continuous growth, and not let them stand still or go back six months in the year.

Trees can not be healthy unless they have such steady continuous growth, and it should be our aim to give them such growth.

If these two things have been looked after we shall have fruit of first quality, and in good quantity. I venture to state this proposition,—that every one wishes to raise first quality of fruit; but every one does not. In some experiments as to the quality of apples grown on trees that were properly cultivated and the fruit thinned, there was found to be a decided difference in favor of that when compared with that raised on trees grown in grass and with less care.

As the attention of people is called to the difference in quality there will be more difference in the prices paid for fruit, and that of first quality will meet with ready sale, while second and third-rate fruit will go begging for buyers, and this will be more especially marked in years when fruit is plenty.

You may be ready to ask why drainage has not been more extensively practiced, if this be true? We will for a few moments consider some reasons for it, or drawbacks that have kept farmers from it. And first is the cost to the pioneer. Every one is aware that in the early settlement of a country, the mass of the settlers have all they can do to keep the wolf (starvation) from the door, and that they have very little to invest in way of getting fruit. If they have the money to spare to get a few trees, they feel rich and think only of the trees. The cost of underdraining would entirely preclude them from having fruit if they waited to raise it on drained land. Second, they are in haste to get their trees growing and hardly wait for any great length of time to get ready for the trees, but put them out among the stumps, and do the best they can under the circumstances. It is a great privation for families to do without fruit when in their eastern or more southern homes they have had it in comparative plenty. To buy, as pioneers, seems almost out of the question, hence their anxiety to get trees growing.

Third, The comparative recent introduction of tile drains in this country. This was not brought about until about the year 1850.

In 1835 Mr. John Johnston made the first tiles in this country from patterns obtained in Scotland. The results were so good that in 1848 Mr. Delafield imported one of Scragg's tile machines.

The use of tile gradually spread so that we may say 1850 was the year in which tile drainage was firmly established. It was not until 1858 that round tile were introduced, which gave us the most perfect system known. The short time that drainage has been in use would preclude the idea of finding many orchards drained before setting the trees, in the older portions of our State, and they are not very likely to be drained after, as men are more likely to give as the reason of non-growth or non-production, almost anything beside the want of drainage.

Fourth, Farmers obtain comparatively good results without drainage, and thus are easily satisfied. Perhaps they will add: "O well! drainage is well

enough for those who are to make a specialty of fruit-growing; but for me it will not pay. I have not the time nor the means to attend to it."

As well might the farmer argue that it would not pay for him to prepare his ground well for wheat, because he does not make a specialty of wheat-growing; or tend his corn well because he is not a corn king among his neighbors. Another objection urged is that it is too late to do anything now, nearly all the orchards are planted that will be needed in this part of our State, and there is no use of making a radical change.

But farmers and friends, do you not know that every year thousands of young trees are being sold in these same old portions of our State? And for what purpose? *Viz.*: to fill up the vacant spaces occurring yearly in these same half-cared-for orchards. A better era I am happy to say is dawning upon us. The organization of many influential men in this State Pomological Society, as well as many local societies, cannot fail to have a renovating influence. The holding of such meetings as this in various portions of our State cannot fail to assist in arousing an enthusiasm. In the next ten years we hope to see some new orchards put out with due preparation. In many places where grievous mistakes have been made, men are thinking of abandoning the old orchard, taking what it will do without care until a new one can be put out and raised to bearing on correct principles.

Then the old one is to be dug up. Do not be deterred from using drains on account of the roots entering the joints and stopping them. If afraid, you can cement the joints in the more exposed places; but use the drains. I was talking with a man last month, who had drains down fifteen years in an orchard and had only been stopped at the end that length of time. When asked if he intended to take them up and replace them, he replied: "Certainly, sir. I would not be without them there for half the value of the orchard." And now, my friends, let us consider for a moment the preparation. When a farmer wishes to raise a fine crop of wheat, he spends a large portion of the working season in a year to prepare a proper place to deposit the seed. He well knows that to half plow a piece of ground and then broadcast his seed, and half harrow it in, would be but to insure him meagre returns. But when the good farmer goes to set out an orchard instead of spending one or two years to get the ground well fitted, drained, etc., he usually orders the trees, and when they arrive casts about for some piece of ground that he can get plowed the easiest, and then puts his trees in as best he can. How much wiser for this man to spend two or more years in preparation, when he takes into consideration the fact that his orchard is a crop that is to be carried through the next fifty years, or even that he make as much preparation as for his wheat crop that lasts but a single year. In regard to fruit raising, I fear we know how, better than we do. But let us not shut our eyes to the fact that if we expect to succeed we must adopt measures to make quality instead of quantity the desideratum. While passing through Chicago I saw apples that were labeled "Michigan apples," and were the best the market afforded; they were also sold higher accordingly. We have also won the premiums at many fairs and expositions; but let us not in view of these facts rest on our laurels. If we expect to improve and go forward, keeping pace with our sister States, we must be up and doing—we must work.

Mr. Lord.—I have some practical interest in the matter of stoppage of drains by the roots of trees. It seems to me there may be some question, perhaps about the advisability of orchard drainage—except in cases where the ground

WINTER MEETING, 1877.

is quite wet, simply because of this trouble of root stoppage of the tile. No long ago one of my drains ceased to flow, and not until I had expended a hundred dollars did I find out the cause of the difficulty. It was at last ascertained to be the rootlets of an apple tree near by, which had been thrust into a length of tile to such an extent as to completely fill up the aperture. This bit of experience led me to wonder if it would not be advisable to select with greater care the land upon which an orchard is to be placed—according to the necessity of tile drainage—when it may in the end be so costly an investment.

Mr. Ingersoll.—I admit there is some danger from this cause, but from the experience of others I glean that tile will not be liable to fill up opposite the trees for say fifteen years, and an orchardist can well afford to clear them out as often as that.

Mr. Moody.—I can suggest from my own experience a cheap remedy for this difficulty. It is my practice now to make a cement of water lime and sand and put over the joints next to the trees, thus effectually excluding the rootlets from any entrance therein, and not in the least checking the effectiveness of the drain, as the water without difficulty finds its way through the porous tile.

I have, to ascertain the porosity of tile, experimented somewhat by placing a tile plugged at both ends in water, and have found that it will fill in a minute.

LANDSCAPE GARDENING FOR FARMERS.

Secretary Garfield next occupied nearly an hour of the session with an address upon the above topic, of which the following is a brief abstract.

He opened with the statement that he should not aim to say pretty words about pretty possibilities, nor spread before the audience an elaborate system of landscaping, but he should simply deal with such modifications of country homes as will exhibit taste, develop refinement, and enhance the money value of these homes at very little expense in cash, but with the best of results to the family circle.

Why should we beautify? *First*, For the beauty itself. *Second*, For what beauty will effect in man. The results most noticeable in the matter of house adornment are: (1) an added refinement; (2) a satisfaction of possession; (3) development of a new set of faculties; (4) an exhibition of benevolent spirit; (5) a higher appreciation of the created things of God. Lastly, an increase of possessions which might be classified simply as a satisfaction, a sort of stock in trade not to be negotiated; or a something which, in case of a sale of the property, might bring cash to the pocket. It is a mistaken idea that utility and beauty are incompatible. Nothing is truly beautiful that exhibits a breach of utility. Several illustrations were cited upon this point.

In the matter of practical hints, he first took the house, and although disclaiming to dictate as a builder, he made several suggestions, of which we mention two: First, the living-room in the house, whether it be kitchen, sitting-room, or parlor, should have the pleasantest outlook of any room. Second, the arrangement of entrances should be such as to eliminate any chance of error in getting at the proper place for visitors to enter the house. The speaker related how, a little time before, he had been misled by appearances, and, instead of entering, as he supposed, the front of the house, he had to be led through the wood-room, kitchen, and dining room, before finding the place to be seated!

The lawn next claimed his attention as the most important accompaniment

of the house. He recommended that it be made once for all. Nothing would answer short of stirring the ground two feet in depth; then thorough fertilizing and smoothing, and grass seed rather than sod. Have no walks except good ones,—and a good walk or drive requires considerable labor in the beginning. Good gravel with clay enough in it to pack it eight inches in depth is a requirement.

In speaking of trees and shrubs, he gave the tonguey agent a cuff for selling so many tender things and recommending them as hardy. No trees or shrubs are so valuable for ornamental purposes as those gathered from the forests of Michigan. Grouping requires skill, but experience in this instance is a pleasant teacher. The one thing he liked best in the arrangement of grounds was individuality—that is, something that bespeaks the peculiar taste of the family.

Flowers he would have in abundance, but in a garden by themselves, and not scattered promiscuously in beds over the lawn. Flowers are made to pick, and the plants are better for the picking. Flowers should be placed all about the house, and especially where the mother and daughters can have the benefit of them while engaged in the various duties of the house.

To meet the expense of adornment of his premises, the farmer should be more of a business man, making more of his time, and not allowing everybody to break into it any more than the merchant does. The farmer might drop a good many little vices, of which the use of tobacco is a type. Also give up the desire of a large bank account at the expense of home comfort. Lastly, unite the family in the work of beautifying. A large part of the work can be performed by children, as a beautiful pastime, and in so doing the family becomes more united in other things, and bound together by bonds that cannot be severed. And, best of all, as a result, memories of the most cherished sort are laid by for the second childhood which so lingers over the experiences and pleasures of youth.

The last exercise of the evening was the

REPORT OF THE COMMITTEE ON NOMENCLATURE.

Mr. President and Gentlemen of the Michigan State Pomological Society:

Your Committee on Nomenclature have the pleasure of congratulating the society and the fruit growers of Michigan upon the growing improvement in true and correct nomenclature in all those sections of the State over which our labors have extended, and also upon the solicitude of orchardists to correct the lists of their fruits and the grateful good humor in which the corrections of their prevailing errors of names are received. We find, in the very fine and highly creditable display—of apples in particular—before us to-day, a wide field and an abundant necessity for our labors, as has been the case at the other places where our meetings have been held. But we note that whenever we hold a second meeting in the same locality we do not find that prevalence of the same errors, and we can very safely predicate upon these facts a very apparent improvement in this direction in this progressive region of the State. The labors of your committee, like the aims and mission of the Michigan State Pomological Society, are purely educational. That we have met with a gratifying measure of success in these aims is shown in the truer nomenclature at our periodical exhibitions of fruits. It is from facts and results like these that

your committee derive their chief encouragement in this field of genial labors. This is a work into which your committee must throw themselves with earnestness and enthusiasm, and it is with great pleasure that we receive the frequent expressions of appreciation and encouragement from our pomologists. It is no light matter, Mr. President, to gain even a reluctant assent to the yielding up of the received names, though ever so erroneous, and that are held sacred by every association and prejudice. "Why, my good old father and mother have always called this the so-and-so pippin, and it is hard to hear you pronounce it something else," is the substance of many a protest from honest growers. Your committee indulge the hope that ere many years more of this persistent labor in our educational department of pomology, we may have the pleasure of correct lists by exhibitors generally, and not as the exception, as at present, and that the time will come when we shall no longer have growers contradicting us for calling their "Steele's Red" the Red Canada, or their "Red Canada" the Flushing Spitzenberg; when we shall no longer be censured for withholding a recognition of Ben Davis and other third-rate varieties as first-class for Michigan; when growers will consent to drop the name of "Steele's Red" for Red Canada, and eliminate all erroneous and superfluous names and sorts, clinging to all that is good, whether new or old.

Thursday Morning.

Mr. Whitney offered the following:

Resolved, That the Pomological Society should take steps at this or the June meeting, to make an exhibition of Michigan fruit at the Chicago Exposition the coming autumn.

In support of this resolution, Mr. Whitney said our great fruit market was Chicago, and as a matter of financial benefit to our fruit growers, it is far better for us to show there than even at the meeting of the American Pomological Society in Baltimore, and as we can ill afford to show at both places, he felt that our effort should be concentrated at Chicago.

On motion, the resolution was referred to the Executive Board.

The question of the immediate disposal of the life membership fund was brought up, and in the absence of Mr. Webber, the following communication was read from him:

The life membership fund should be placed in condition for present use, and not remain as an investment, because—

1. This Society in its nature and objects, is not fitted to keep and safely care for investments, and there is danger of loss, for that reason—

2. This Society relies on the public for its income, and with that income it assumes to serve the public,—with a large fund the public can have better and greater service, and we should use our funds so far as we can to subserve the greater good. Money invested in education is better than ten per cent.

2. As now ordered, if we offer a life membership as a premium, we must take the money from our annual fund and invest it. As we have not the money for that purpose, we are prevented from offering life membership premiums. I think it would be an advantage to the society to have a largely increased life membership, that we may have a continued interest in the operations of the society fostered and sustained by those who are permanent members, and who

for that reason will take a permanent interest in its affairs. Through their influence we will be likely to have a greater annual income from annual memberships.

4. As we are engaged in serving the public, we have a right to rely on the public for annual income sufficient for our needs. If the society serves the public *well*, such service will be recognized and sustained. A permanent endowment, therefore, is unnecessary.

W. L. WEBBER.

Messrs. Merriman, Adams, Beal, Rowe, and others maintained that our life membership fund was obtained under the express understanding that it was to be permanently invested and only the interest employed by the society, and it would be a breach of faith to now use up all the available funds of the society. They thought the very fact of the permanency of this fund would result finally in an endowment which would carry on the society in good shape, and raise it above poverty or dependence. To be sure, it was said we are not beggars, because we give value received for every dollar expended in our behalf, but inasmuch as the people are somewhat slow in their moneyed appreciation of our work, it is better that we should look finally to a permanent fund that should support the work of the association.

A motion to adopt the plan of immediate use of the life membership fund was lost.

Prof. Cook not being able to be present, Secretary Garfield read his article prepared for this meeting, on

THE IMPORTED CABBAGE BUTTERFLY.

Pieris rapae, Schrank. Family, *Papilionidæ*. Sub-order, *Lepidoptera*.

In my report on the injurious insects of Michigan, published in 1875, appeared the following: "In describing the rape-butterfly, I shall depart from my usual practice at this time, and describe an insect not yet among us; for though not now a practical subject with us, it is likely soon to be, as this latest arrival from England is fast nearing our own beloved State, and without doubt will soon be one of the worst pests of our gardens. What would we think of a report of like design, to be published in Massachusetts, that should fail to give the fullest practical information as to the Colorado potato beetle?" Scarce two years have passed since the above was penned, and yet both prophecies, the one stated and the other implied, are fulfilled. The rape-butterfly is sorely vexing the gardeners along the eastern and southeastern confines of our State, while Massachusetts is commencing to wage relentless warfare on these terrible invaders of her territory from the far western plains.

It is a fact, Mr. President, that the horticulturist of Michigan has now got to contend, in his garden culture, with a foe which has few if any equals; and well may the lovers of pickled cabbage, coldslaw, and sourkraut, desire heartily to second the earnest and timely efforts of our Lenawee friends—and here let me say that the Lenawee club deserves our gratitude and admiration,—who are already preparing for the conflict by recruiting, in arousing attention, and by sharpening their weapons of warfare in calling for such information as I hope to give in this paper.

Already I have heard of this new enemy, whose banner here as elsewhere is havoc and destruction,—in Lenawee, Monroe, and Wayne counties. That our whole State is doomed to invasion within the next year or two, is as certain as that we shall continue to raise and enjoy the delicacies which are furnished in those incomparable vegetables, kale, broccoli, kohlrabi, cabbage, and cauliflower.

NO LESS GRITTY THAN DESTRUCTIVE.

The fact that this imported cabbage butterfly continues to depredate in its native European haunts, where the conditions are so severe, argues ill for its speedy discomfiture here. One of the many principles established by the adherents to the doctrine of "natural selection" is the fact that plants and animals, when introduced into a new country, find the "struggle for life" less severe, and as the fittest survive, usually thrive, even at the expense, and frequently to the utter extermination of the natives. This fact, so amply sustained by our experience with the Hessian fly, wheat-midge, codling moth, currant saw-fly, etc., etc., is no pleasing one in view of our subject. If the rape-butterfly can flourish amidst the vicissitudes of old England, what may we expect in new America. I can only answer in the language of one Patrick Henry, when referring to a previous invasion from the same old England: *We must fight*; nor can we hope to vanquish our foe even in eight years. In England this butterfly is so common as to have gained the sobriquet "the butterfly." Both of our native white butterflies, belonging to the same genus as the one in question, of similar habits, and subsisting on the same food plants, though "to the manor born" are so impotent to do mischief, that few know even that they feed on cabbage, while this imported species, before it was hardly naturalized, having been this side the ocean scarce a half dozen years, was said to destroy annually, about the single city of Quebec, \$240,000 worth of cabbages. Hence we see that this is a question of no minor importance, and if to be forewarned is to be forearmed, I shall surely have done some good in the work of preparation for the coming conflict.

HISTORY THIS SIDE THE ATLANTIC.

This insect was imported in 1857 or 1858. It was observed and taken by a Canadian entomologist in 1859, at Quebec. From that place as a center it has rapidly spread to the west, and more rapidly to the south, reaching Washington some years since, and during the past season entered our own goodly State, where, true to its reputation, it commenced a thorough work of extermination.*

DESCRIPTION.

This butterfly is about the size of our two native species; the usually immaculate *Pieris oleracea*—Boised, which fifteen years ago was by far our most common species, and the now more familiar *Pieris protodice*—Boised, which is more or less thickly sprinkled, flecked and spattered with black. The new comer more closely resembles the second, though the black is generally not so wrothly marked, though the spots are more definite in form and position. The general color is usually white, though in England, as also in this country a yellow

* The rape-butterfly has now crossed our State and reached Chicago—November, 1877.

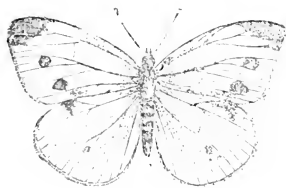


FIGURE 1, FEMALE.

neath the markings are much the same, in both sexes having two spots on the primaries, corresponding in position to those on the upper surface of the same in the females. The wings beneath are also tinted with yellow, especially near the tips, which feature is important, as in rare cases the spots are so obscure, or so entirely absent, that the yellow tint becomes of much importance in determining the species.

The eggs are laid either singly or in clusters of two or three beneath the cabbage leaves. They are so small as to easily escape notice, but under the microscope are observed to be beautifully marked. They are white at first, but soon turn yellow.

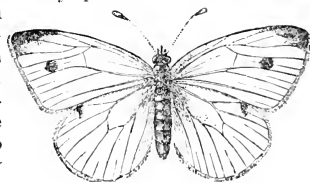


FIGURE 2, MALE.



FIGURE 3.

a, larva, *b*, chrysalis.

The caterpillar (see fig. 3, *a*) is of a pale green color, finely sprinkled with black, with a yellow stripe along the back and a more obscure one along each side. When fully developed it is over one inch long.

The chrysalis (see fig. 3, *b*), which will be found under a clod, board, fence-rail, etc.,—Mrs. Bessie Strong of Fairfield, Lenawee county, writes me that she found many on the cabbage leaves,—is of the usual form of papilionaceous chrysalids, and is suspended not only by the tail, but also has a fine silken cord thrown around its shoulders. How the caterpillar can accomplish this feat,—spin the cords, make the attachments, and then get out of its skin,—is a marvel which would cause even a philosopher to knit his eye-brows. But I am not going to explain it. It, with thousands more equally wonderful exhibitions, are being enacted every summer's day all about us. Is it not possible that were our children taught to observe these startling performances of nature, the less astonishing feats of circus clown and acrobat would lose something of their attraction, while the saloons would entrap fewer of those just ripe to be ensnared? I tell you, gentlemen, it is not only possible, but certain. The color of the chrysalis is green, sprinkled with small black dots.

Thus I have daguerretyped this evil doer, and I urge each and every gardener to constitute himself a detective and secure the picture that he may be ready to recognize and repulse these arch destroyers at the first onset.

NATURAL HISTORY.

The imported cabbage butterfly, like both our native species, is two-brooded.

* Figures 1, 2, and 3 are from the skillful pencil of Prof. C. V. Riley.

The first butterflies appear early in the season, April or May. After a brief courtship and honeymoon—they are too bent on mischief to let even this take much time—the female commences the work of egg-laying. That the offense is premeditated is clearly obvious in the deliberate, sauntering style in which she wings her flight from plant to plant. Very soon the tiny, green larvæ are ready to issue, and even here they show their voracious tendencies, for they not only eat their way out of the shell, but pause to devour it entire before they commence to gormandize on the more appetizing cabbage leaves. After this hardly a fortnight has passed by before the larva has fought its evil fight, finished its course,—and just a word about this course: The larva is not content to feed upon the outside leaves. It seems to possess an instinctive knowledge of those lighter, tender, juicier leaves about the core, towards which it at once proceeds. And more, this is what most disgusts the tidy housewife, for be as careful as she may, she is pretty certain to chip off several “worms” as she prepares the savory cabbage for dinner, and even though harmless, such condiments are seldom relished. The mature larvæ now leave the cabbages and seek some concealed place, under board or rail, where the wonderful suspension feat is accomplished, and the insect becomes a chrysalid. In June and July the second brood of butterflies appears, when the same round of mischief—except that it is apt to be augmented by increased numbers—is repeated. The second lot of chrysalids, however, instead of remaining a week, continue the winter through.

Thus, with the times and seasons fully before us, it is well that we now, in the interest of both table and purse, consider the

REMEDIES.

As already intimated, these butterflies are lazy fliers, and may easily be taken in a net and destroyed. To make a net—and, by the way, children should always have these, that they may early learn to observe and study in this interesting department of nature,—procure at a hardware store a piece of the largest size wire (*fig. 4*), three feet long. Take this to a blacksmith shop, where,

FIGURE 4.*

with the exception of four inches at each end, it is to be bent into a circular form. Now let the ends be bent at right angles to a tangent to the circle,



FIGURE 5.

(*fig. 5*), where they are attached, these ends welded together, and sharpened to a point (*fig. 6*). Now let this point be inserted and driven firmly into a hole previously bored in the end of a broom-handle (*fig. 6*), and we have the frame work complete. The bag which is to be fastened to the circle is made of mosquito netting, or, better, of strong muslin, and to secure more strength, a strip of strong factory should be bound about the netting where it encircles the wire ring, and sewed on strongly with it (*fig. 7*). Children will not only do this catching cheaply, but will greatly enjoy it. Children may

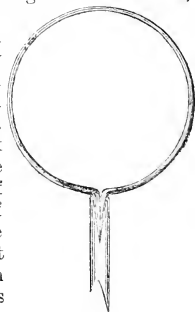


FIGURE 6.

* Figures 4, 5, 6, and 7 were drawn by Mr. W. S. Holdsworth, a member of the Junior class of the Michigan Agricultural College, and engraved by Miss S. E. Fuller of New York.

also be employed to collect and destroy the eggs. This, of course, from the size of the eggs, would require great care. Paris green and white hellebore

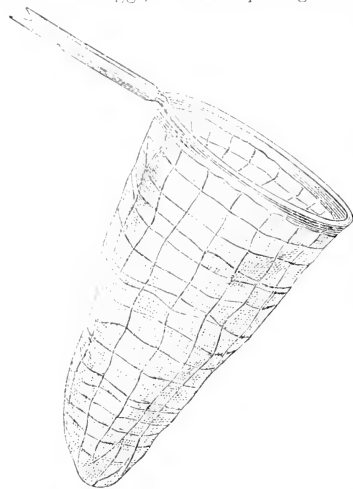


FIGURE 7.

will kill the caterpillars, as they will also any one who eats the cabbage; so as they—especially the Paris green—could not be so washed off as to remove the danger, their use is not to be recommended. Cresylic soap solutions and copperas water are also said to destroy the worms; and as these are not poisonous, free use may be made of them. The most convenient method to destroy is to make use of the habit which the insect has of pupating under some projection of building, fence or tree. We have only to keep the garden free from rubbish, and then place boards horizontally three or four inches from the ground, between the cabbage-rows. These may be sustained by mounds of earth at either end, or by nailing to short pieces of boards, after the fashion of the seats in our old-time school houses. As the insects suspend beneath these, they may be collected and crushed.

But if I were the boy thus employed, I should rest prone on the earth, even at the risk of untidy clothing and a reputation of indolence, till I saw how they put themselves up. These boards, during the first period of pupation, must be examined every six days, as the chrysalis remains only a week. Mrs. Strong, as already stated, speaks of pupation on the cabbage leaves. Very likely these are attacked by the parasites soon to be mentioned, and are too feeble to migrate.

NATURAL ENEMY.

To any one who rightly understands the conflicts in the insect world, either with birds or other insects, the first question that occurs when a new insect appears is: has it any natural enemies? for without beneficial birds and insects successful farming would be at an end. But with this pest, which has held its own so long and so well among the keener scented and sharper eyed foes of the old world, what could we hope from the less aggressive natural enemies of our own land? As yet, none of our long list of native predaceous and parasitic insects have joined in the battle to stay the progress of this ruthless invader. Well might we hope that, as with the Hessian fly, some of its old enemies—insects which have bravely fought side by side with man in the work of subjugation in its native home—might come with it to join in the battle here: nor have we hoped in vain, for a minute ichneumon fly, scarcely an eighth of an inch long, has crossed the Atlantic and come to our aid. This tiny friend, a second La Fayette, was first discovered by the young son of my old entomological friend, the late Mr. P. S. Sprague, of Boston, Massachusetts. Can it be that he made this discovery by practicing what I have advised while gathering these insects? If so, I knew his father too well to think that he would be other than praised for the scrutiny that led to this welcome discovery. This wee ichneumon fly—*Pteromalus puparum*—Linn.—is of a bright gold color. The female

lays her eggs inside the chrysalids (I know these are sometimes, if not always, laid on the larva, though almost all writers say on the pupa), where the young hatch sometimes to the number of fifty, when they proceed to devour the host which thus furnishes them home and food. Thus these tiny cyclops do us a service which we can not over value.

From a large number of larvæ which I received from Buffalo last autumn, all of which became chrysalids in due season, only three have survived the attack of this Lilliputian foe. I have specimens of both here, so that you may see the difference between healthy and diseased pupæ. Those chrysalids, as you see, that are attacked are of a darker color, owing to the quick consumption from which they are seriously suffering. In destroying the chrysalids these darker ones should be carefully spared, as we will thus breed thousands of these little friends, whereas by destroying the chrysalids, we should likewise overcome these valuable abettors. We may hope, and not without reason, that this little parasitic fly will do much to mitigate what will prove, even with them, to be a serious plague. We can only hope that even more of this butterfly's old home enemies will take voyage to our shores.

Following Prof. Cook's paper, a short discussion ensued upon

SCIONS.

Mr. Whitney.—I would like to inquire if it is just the thing for a nurseryman to do, to use the trimmings of two or three years old trees for scions in root grafting? It seems to me that there is a semblance of cheating in this method of propagation, when we add the fact that a root is cut up into indefinite pieces in the production of root grafts.

Mr. Moody.—After a long experience I am satisfied that if wood is well ripened, there is little choice between scions taken from young or bearing trees. We are after healthy wood, and in young, vigorous stocks we are the most apt to find it.

Mr. Merriman.—There has been a good deal of grumbling over this method of propagation, and I am not sure but it may be carried to an extreme so far as the root goes, but am satisfied we do not put off the date of bearing of a tree by making that tree of a scion from a young healthy stock, even if it has never borne an apple.

Mr. Ilgenfritz gave his testimony in the same direction.

Mr. Thomas.—I have found the average tree agent a scoundrel, but have always had a good deal of confidence in the established nurserymen of our country, and when a point is agreed upon by men as well versed as the gentlemen who have just spoken, I am satisfied to accept their verdict, particularly as it agrees with my own experience.

THE COMMITTEE ON APPLES

through their chairman, Prof. Beal, made the following report:

MR. PRESIDENT:—Your committee on apples beg leave to submit the following report:

There are on exhibition by actual count, 461 plates of apples, of over 100 different named varieties, and perhaps ten not named.

W. K. Van Sickle, Waterford, exhibits 12 varieties.

Hartwell Green, West Bloomfield, exhibits 11 varieties.

E. Hamilton, Royal Oak, exhibits 6 varieties.

G. W. Benjamin, Pontiac, exhibits 23 varieties.
 Charles Broad, Waterford, exhibits 5 varieties.
 J. J. Voorheis, Waterford, exhibits 10 varieties.
 Mrs. J. H. Pearsall, Pontiac, exhibits 4 varieties.
 W. F. Kelley, Pontiac, exhibits 7 varieties.
 H. C. S. Carus, Walled Lake, exhibits 9 varieties.
 Wm. Batey, Pontiac, exhibits 7 varieties.
 T. N. Covert, Southfield, exhibits 7 varieties.
 Moses Drake, Franklin, exhibits 7 varieties.
 John Lessiter, Orion, exhibits 4 varieties.
 Isaac Osman, Pontiac, exhibits 10 varieties.
 J. W. Humphrey, Plymouth, exhibits 11 varieties.
 Grand River Valley Horticultural Society, exhibits 73 varieties.
 South Haven Pomological Society, exhibits 24 varieties.
 W. W. Tracy, Old Mission, Traverse county, exhibits 9 varieties.
 Reynolds, Lewis & Co., Monroe, exhibit 12 varieties.
 E. Moody & Sons, Lockport, N. Y., exhibit 1 variety.
 State Agricultural College, Lansing, exhibits 6 varieties.
 Emmons Buell, Kalamazoo county, exhibits 5 varieties.
 John Thomas, Thomas Station, exhibits 3 varieties.
 M. Leggett, Waterford, exhibits 6 varieties.
 Henry Birge, Waterford, exhibits 7 varieties.
 S. W. Dorr, Manchester, exhibits 3 varieties.
 S. Stowell, Pontiac, exhibits 5 varieties.
 O. Taylor, West Bloomfield, exhibits 9 varieties.
 W. Coanley, Farmington, exhibits 6 varieties.
 S. Howlett, Waterford, exhibits 7 varieties.
 A. E. Green, Farmington, exhibits 11 varieties.
 Porter Beach, Troy, exhibits 4 varieties.
 A. P. Frost, Pontiac, exhibits 8 varieties.
 O. S. Oxford, Oakland, exhibits 3 varieties.
 E. J. Shirts, Shelby, Oceana county, exhibits 9 varieties.
 Harrison Voorheis, White Lake, exhibits 2 varieties.
 I. A. Graley, Pontiac, exhibits 15 varieties.
 L. Crittenden, ———, exhibits 2 varieties.
 Mrs. A. C. Baldwin, Pontiac, exhibits 5 varieties.
 Mrs. ——— Whitfield, Waterford, exhibits 4 varieties.

Above are given the names of 40 persons and Societies who have made exhibits. Now for some of the honors. The north table in the front aisle contains fruit raised in Oakland county. The south table contains fruit raised in other places. These contain some of the best plates of some of the numerous varieties on exhibition.

They are not necessarily all recommended for cultivation.

H. Green—Yellow Bellflower, unusually fine.

G. B. Benjamin—Fameuse, very nice and perfect; Fall Pippin, good; Westfield Seek-no-further, best plate on the tables, and Tompkins County King. Charles Broad—Northern Spy—best exhibition; Red Canada—color perfect.

T. N. Covert—Fine Canada Red.

John Lessiter—Baldwin, fine.

O. Taylor—Red Canada, Northern Spy, extra fine.

Isaac Osman—Canada Red, very fine.

M. Leggett—Flashing Spitzenberg, good.

Jacob Taylor—Baldwin and Red Canada, fine samples.

A. E. Green—Rhode Island Greening, good.

Thomas Whitefield—Rhode Island Greening, good.

J. Graley—Rhode Island Greening, very good.

O. S. Oxford—Fallowater, and Northern Spy, beautiful.

J. W. Humphrey—Pomme Gris, excellent.

G. R. V. Horticultural Society—Jonathan, extra fine, and rich dark color; Fallowater, fine; Fameuse, extra large and fine; American Golden Russet, Wagener, Summer Sweet Paradise, Canada Reinette, Baldwin, perhaps best plate.

W. W. Tracy—Esopus Spitzenberg, high-colored and very perfect; Duncelow, very showy and fine; Autumn Strawberry, very fine and sound.

Monroe Nursery—Peck's Pleasant, fine; Esopus Spitzenberg, fine.

Emmons Buel—Wagener, extra fine and large; Northern Spy, largest on exhibition; Roxbury Russet, Jonathan, extra fine.

E. J. Shirts—American Golden Russet, good.

E. Moody & Sons—Mann Apple, very perfect.

It has been impossible to do perfect justice to all exhibitors here. Many very fine plates are not on these tables, we had room for only a few. We do not make especial criticisms of poor specimens on exhibition,—there are some, as you have all seen. We wish we could do more to stimulate people to show none but good, nice specimens. I have overheard some here saying how much better they could do if they had only tried. When picking fruit, hunt up the perfect specimens and take extra care of them. Look for specimens of fair size of the variety, perfect shape and color, without spot, worm, or blemish. Leave the stem on. There are not a *very large* number of such apples now here on exhibition, compared with the whole number, I have found but very few; only one Northern Spy which fills my eye. Overgrown Greening, American Russet, Spy, are not the best. The highest colored fruit is not always the best, but frequently the reverse. Quality of fruit to be first. A good point made by Prof. Ingersoll. Our people will cultivate their eyes by looking for perfect specimens.

This is a grand show of fruit for this time of year. I do not remember to have ever attended a meeting of the State Pomological Society in which the people seemed to show greater interest. Oakland county has done herself great credit. We are progressing. Let no poor fruit hereafter ever find its way to any of your fairs.

W. J. BEAL,
BYRON G. STOUT,
E. H. REYNOLDS,
Committee.

Appropriate resolutions of gratitude to the people of Pontiac for their kindness and cordial entertainment were unanimously passed, after which the society adjourned to meet at South Haven in June.

MEETING OF EXECUTIVE COMMITTEE.

Pontiac, February 6, 1877.

Committee met at eleven o'clock, and there being no quorum, an informal discussion was carried on for an hour, when they adjourned to meet at four P. M. At the appointed hour the committee met again, with the following members in attendance: Messrs. Lyon, Webber, Chilson, Reynolds, Adams, and Garfield. Reports were presented from the former Secretary and Treasurer, and the Finance Committee, of which Prof. Cook was chairman.

On motion the reports of the Secretary and Finance Committee were referred to the new Finance Committee to be appointed at this meeting.

The Treasurer was instructed to act with the Secretary in tabulating his report, and then refer it to the Finance Committee.

The President announced the following committees:

On Finance—Messrs. Chilson, Webber, and Reynolds.

On Premium List—Messrs. Webber, Chilson, and Reynolds.

Advisory Committee on Report—Messrs. Webber and Adams.

On motion the Secretary was authorized to purchase such blanks as are necessary for the use of the society, after consultation with the President.

On motion the Treasurer was instructed to give bonds to the same amount as last year, subject to the approval of the President.

Letters of invitation were read from Allegan and South Haven inviting the society to convene at these places for summer meeting. After a due consideration of the same, on motion of Mr. Webber, the June meeting will be held in South Haven with the South Haven Pomological Society, the date to be determined by the President as early as possible.

On motion the President was instructed to appoint such standing committees as were suggested in his inaugural address.

Adjourned to eight o'clock on February 7th.

Wednesday Morning, February 7.

Executive Committee met pursuant to adjournment, and received the report of the Committee on Premium List. The committee announced some changes in the old list which made the exhibits more definite and added a number of premiums. Report accepted and adopted.

The Secretary was instructed to make such explanatory notes in the premium list as he saw fit after consulting with the President.

The committee whose duty it was to secure a room in the new capitol reported very little progress as yet, and were continued in office.

On motion of Mr. Webber, the President was instructed to draw up an appropriate memorial to the Legislature, asking for a place in the new capitol.

A request was presented from Prof. Cook regarding illustrating his last two articles before the society, at a cost of \$35.00 or \$40.00.

On motion, the professor was ordered to go ahead in the matter, and do it as cheaply as possible.

The Superintendents for the next fair were appointed:

Fruit—Superintendent, N. Chilson, Battle Creek; Assistant Superintendent, E. H. Reynolds, Monroe.

Flowers—Assistant Superintendent, E. F. Guild, East Saginaw.

On motion, each member of the committee was instructed to select two members for the orchard committee, from which the committee will be made up at June meeting.

On motion, the Secretary was instructed to cancel the checks returned to him from the Treasurer of last year, and keep them on file.

On motion, the annual meeting will be held in Grand Rapids, first Tuesday in December, in acceptance of an invitation from the Grand River Valley Horticultural Society.

On motion, Mr. Adams was instructed to look up the matter of supports for labels to be placed upon plates at fruit exhibitions, and report at June meeting.

Report of finance committee was received and accepted.

Committee adjourned *sine die*.

CHARLES W. GARFIELD.

Secretary.

THE JUNE MEETING,

HELD AT SOUTH HAVEN, VAN BUREN COUNTY, JUNE 19, 20, AND 21.

REPORT OF DISCUSSIONS, WITH FULL TEXT OF PAPERS AND ADDRESSES.

The June meeting of the Society was well attended, and the meeting was characterized by interesting discussions throughout. The opening session on the evening of June 19th. was occupied first by the reading of letters from interested Pomologists, a few of which are given.

From J. Whittlesey, of St. Joseph, June 8th:

"I regret I cannot be at the meeting at South Haven. I shall be engaged at that time in attending to the picking of my cherries; it is a matter I cannot trust to others; also my grapes are driving me; I have so many that I must give handling of the vines my personal attention. Your meeting will be too late for our big strawberries; they will be nearly all marketed by that time; 2,000 one-half bushel cases were shipped to Chicago Wednesday night. I think 5,000 cases will go on to-night at least. Apples about here promise a small crop. Grapes and pears look exceedingly well."

From Eli Bidleman, a member of the Executive Committee, Coldwater, June 19:

"I will send you a little account of the fruit prospects of Branch county. All small fruits are bearing finely, except cherries, which will not be a full crop; they blossomed very full, but from some cause failed to set but comparatively little fruit. Peaches, where there are any trees old enough, are full; pears, very good prospect; apples nearly a total failure; grapes promise a full crop. Other crops are looking very well except wheat, which is, in parts of the county, badly injured by the fly. Corn is doing very finely, and the prospect is that potatoes will retail for less than two dollars per bushel soon. Oats and grass are rather more than the average promise. There is, I am sorry to report, an appearance of the canker-worm in this county. In company with Mr. Aldrich, of the Republican, I paid the orchard a visit the other day, and it was a discouraging sight. The worms had returned to the ground, and the trees had begun to show signs of returning life. But there is no doubt of the fact of their hold on Mrs. Lydia Ensley's orchard in Batavia, Branch county, five miles west of Coldwater. So far we can hear of no other orchards being troubled, and we are doing all we can to rouse the neighborhood to the necessity of an uncompromising war on them, and I believe they will see the necessity and will try and prevent the further spread of the pest."

From B. Hathaway, the poet horticulturist of Little Prairie Ronde, June 18 :

"I had expected to bring samples of the Michigan strawberry to South Haven, which I continue to cultivate, and with which I am still abundantly satisfied, as it and the Wilson are the most profitable kinds on my grounds. I would also have brought another seedling of mine that is nearly if not quite equal to the Michigan in productiveness, and has, besides, some features peculiarly its own. It is, also, a scarlet berry, of good flavor, long necked, and quite firm for a scarlet variety. It is one that I shall propagate further, and is worthy of trial otherwheres. It may be of interest to some if I say that the seedling cherry that originated with me ten or fifteen years ago, and partially disseminated, has this year borne a very fair crop. I think I sent Mr. Lyon a tree of it, also one to Mr. Downing. The latter wrote me last year about it, saying it was earlier and finer than the Richmond, and inquired about its bearing qualities. Its first promise was to bear properly, but for several years it has disappointed me. Two years, however, it has borne as well as the Early Richmond of same age, which is all that can reasonably be asked. Heretofore the curculios have spoiled the fruit of this cherry badly, but this year it has mostly escaped this insect. I will also mention, as a matter of interest to experimenters, that I have about one hundred and fifty seedling raspberry plants, among which are some of remarkable vigor and promise. I am in hopes to get a thornless that has the vigor of the Mammoth Cluster, or a black cap that has the cane habit of the Philadelphia. The apple crop of this region is light; mine less than half a crop, and the varieties in fruit not the profitable kinds, except a few."

From Wm. Rowe, of Grand Rapids, June 18 :

"Fruit in this section is about as follows: Apples, very scarce; some of pears and peaches; cherries plenty and good; strawberries never better, and prices low; prospects for raspberries very good. The interest in floriculture is on the increase. Notwithstanding the hard times there were more flowering plants sold in Grand Rapids this spring than at any one previous season, and also in our country villages; this is one of the landmarks of refinement and progress."

ADDRESS OF WELCOME.

The address of welcome to the society was given by Mr. C. J. Monroe, and responded to by H. Dale Adams, both of which are given entire, as follows :

By request of the President of our village it is my pleasant duty to welcome you to our community. While lack of time and talent will prevent my saying any very fine things to you in a literary way, I think I can assure you that our people will show substantial evidence of their appreciation of your coming among us.

We cannot invite you to any very elegant homes, with their rich surroundings of furniture and carriage equipage, but will try to give you some of that hospitality mentioned by Emerson, wherein he says: "I pray you, O excellent wife, not to cumber yourself or me to get a rich dinner for this man, or woman who has alighted at our gate, nor a bed chamber made ready at too great cost. These things, if they are curious in, they can get for a dollar at any village. But let this stranger see, if he will, in your behavior, your heart, and earnestness, your thought and will, get what he cannot buy at any price, in any village or city and which he may well travel fifty miles, and dine sparsely,

and sleep hard in order to behold. Certainly let the board be spread and the bed be dressed for the traveler; but let the emphasis of hospitality not be in these things. Honor to the house where they eat simple to the verge of hardship, so that the intellect is awake, sees the laws of the universe, the soul worships truth, and love, honor and courtesy flow in all deeds."

The state of our finances renders it very easy to comply with part of this advice, and we will make a strong effort to mix in enough courtesy and hospitality to reassure you of your welcome presence.

Recalling the fact that our State is one of the prominent fruit raising States of the Union, that it is specially favored in its location; surrounded as it is by the great lakes, whose modifying influences enable us to raise all the fruits known to this latitude, whose broad surface furnishes us, in its easy swinging motion, a transportation unequaled, and whose cooling waters preserve and give a freshness which far exceeds any refrigerator yet invented; besides, connecting us with the numerous large cities on their shores, which in turn are the distributing offices of a vast amount of now fruit-producing territory.

Recognizing your society with its branches as the exponents of this great interest; that its development has been and will continue to be largely due to your efforts, and, feeling that here on the shores of one of these grand old lakes we enjoy a liberal share of Michigan's favored advantages, we welcome you.

We are sensible that nature has been exceedingly kind in giving us every desirable variety of soil, and in surrounding us with climatic influences which enable us to produce abundantly, and of the finest quality, all of these fruits, and of unlimited markets of such easy access as to place them in the great marts of the northwest in a mature state and most perfect condition.

With these many natural and important advantages we are glad to have you come among us; we need your knowledge and experience that we may learn more efficiently to wisely utilize these natural advantages; in the choice of soil for certain kinds of fruit, in the proper drainage and preparation of the ground, in selecting the best varieties for home and market, that we may plant and cultivate to the best advantage, that we may prune to give air and sunlight, and the greatest convenience in gathering, that we may so thin our fruit of all kinds as to give length of days to our trees, larger and more perfect fruit to our customers.

That we may distinguish the birds that will destroy more insects than fruit, and resort to such other means as will prevent the vast army of insects, beetles, borers, codling moths, etc., from confiscating our fruits and trees too freely; that we may have such a succession of fruit as will last through the season. Control the bearing of our orchards so as to have yearly crops; and, so improve our drying and canning as to round out the year with a never failing supply of what is becoming more and more a necessity, agreeable to the taste, good for food, counteracting the malarious influences of climate, and thus essential to health.

That we may learn some simple and cheap method of irrigation to bridge us over our occasional drouths, that we may investigate the potent influence of our forest trees, whose rapid destruction seems to carry with it some of the essential requisites of raising many of the tenderest and most delicious fruits; that we may preserve the fertility of our soil by adding those ingredients which the tree and fruit subtract; in a word that we may so multiply our knowledge in all the numerous and varied departments of fruit culture, that when

we come to divide its ultimate proceeds, giving to the soil sufficient to increase its fertility.

To the trees and fruit due care,
 To the cultivators a fair share.
 To the insects and beetles their stealings,
 Regard for commission men's feelings
 To whom the fruit is sent
 And sold for a liberal per cent.
 To the baskets, boxes, and crates
 Add warehouse charges and freights,
 For twine and tarlatan save a little,
 With the usual amount of incidental.
 With home's frequent call,
 Through summer and fall,
 For the remainder have a care,
 For that is our "profits" share.

To make this remainder as large as possible is one of the very desirable results of all our additions, subtractions, multiplications, and divisions.

Having been over the four ground rules, our experience has taught us that in this, as in other pursuits, eternal vigilance is the price of victory. The changing of seasons, fruits and markets, and the numerous enemies of fruits and trees require us to be constantly on the alert. We need each one's knowledge and experience, and so these gatherings are essential that we may learn more and more of these things which insure success in this important industry.

We feel that your presence and interest will re-assure our people that the mistakes which may be related here will call out their remedies, that successes will bring with them the truth they come from care, forethought, and patient industry, and so spur us on to renewed efforts to lessen the one and increase the other.

We need these gatherings for mutual encouragement, especially in times like these, when so many put on long faces and repeat with a variety of changes that it is "hard times," and in their solitude think their lot peculiarly unfortunate. It is well to have this interchange of experience to remind us that each has his ups and downs. We require this social communion of thought that we may learn new ways and means, and catch some of the inspiration of the more hopeful, thus resisting us to appreciate the grand fact there is more sunshine than cloudy weather, more day than night, more prosperity than adversity. We want to brood less over the book of lamentations, and study more diligently those encouraging lessons so abundantly found in the good Book of life, recalling the teachings of the vineyard, and remembering the reward of the thrifty husbandman who improved his spring time in sowing the good seed, his summer in weeding out the tares and cultivating his crops that the fall might bring him a plentiful harvest of the fruits of his toil for winter's enjoyment.

In conclusion, gentlemen, we again welcome you to our midst, and trust the hospitality and courtesy of our people will be such as to make your stay pleasant, and, that each and all will glean from this meeting some gem of experience which, transplanted in practice to their own homes and business, will make the time spent here of profit to them.

As the years run on, if any of you should again visit us, we trust you may see substantial evidence that we have profited by this meeting, and we also hope, at its conclusion, as you depart for your several homes that you can truly say "It has been good to meet here together."

REPLY TO WELCOME BY H. DALE ADAMS.

In behalf of the society I am requested to represent on this occasion and its friends here assembled to take part in the deliberations of this, one of our quarterly meetings of the year, I assure you we thankfully accept the very generous offer so freely tendered us, and I trust, sir, when we return to our homes and families, we shall carry with us an appreciation of the friendships and hospitalities that have been extended to us on this occasion, and, sir, be ever able to bear in our memory a grateful remembrance of your village and people.

But, sir, in accepting and expressing our many thanks for this distinguished manifestation of your regard to us, allow me to be plain with you and assure you that that is not all we expect by any means.

Our people and the whole State, sir, have long looked to the pomologists that line the shore of the noble lake whose waters wash the western limits of your village, for that light and guidance in pomological science that have produced the gratifying results so manifest here. In short, sir, we expect the whole story of your experience and success, and, more still, we expect a little aid financially (pardon me, etc.) We expect every man and every woman who is not already a member of our society, will come forward sometime during the progress of this meeting and add their names to our membership list.

Again I thank you for the tender of the hospitalities and welcome of your village and people.

Following these papers, a short discussion ensued on the subject of a new diploma for the Society, Mr. Thompson advocating that the diploma was a proper means of perpetuating the name of the society, and when one is procured it should be of such a character as to be appreciated and appropriate to frame and hang in a parlor or library. He believed in keeping the value of the diploma high, by awarding it only to strictly worthy things, where it will take the place of a twenty dollar premium. The habit of awarding a diploma to every little article lowers its value and makes it of little importance.

The next paper was given at this juncture on—

WHAT IS THE USE OF A STATE POMOLOGICAL SOCIETY?

BY J. P. THOMPSON.

GENTLEMEN:—There must always be embarrassment in talking of only a part of a subject when you mean the whole of it. Michigan Pomology is only a part of Michigan Horticulture. The first is the name under which we fly our flag, but the latter is the thing itself,—the great interest which brings us together, which covers and embraces the entire State. At Chicago they gave a medal to the Michigan *Horticultural* Society, supposing of course, that this great State must include the whole range of rural felicities. At the Centennial constant effort was needed to keep our Society's name from being ignored, for the managers there thought it queer that we should limit ourselves to a subordinate branch of Horticulture, when it was constantly being reported that our soil and climate was adapted, not merely to a branch, though a vigorous one, but to the entire tree,—root, trunk, branch, leaf, flower, and fruit. I hope we shall gradually consent to a change, that our name may tell its own

story of our aims and ends, our designs and objects. Pomology was the pioneer,—all honor to it! Horticulture is a full-grown structure,—not rough and gigantic, but gradually assuming and developing a style of Grecian and classic form and elegance. We notice that nearly all the States have built this way. First the seed, then the tender stalk, and gradually the spreading, blooming bearing tree, grand in form, and perfect in symmetry. In the remarks I shall make, I shall include not only what we preach but what we practice, at our meetings and at our fairs, a broad system of Horticulture.

THE MAIN OBJECT

of such a society as this, then, was and must be *educational*. We first discovered the fact, the seed of truth, that this was a State adapted to horticulture and to its branches, one of which is pomology, or fruit culture. Having determined the fact of adaptation and congeniality, we then sought to develop it. In the farm garden, as well as in the kitchen garden; in the flower garden, in the conservatory, and in the greenhouse; in the orchard and in the vineyard, by amateur and professional; for landscape, for protection, for the highway, for the forest, for the railway; for the country, for the city; for the cottage and for the palace. For if this is a horticultural State then have we some advantages over other portions of the earth. Even if this is a fruit producing State, capable of growing in their perfection the fruits of the temperate zone, then are we the favorites of earth and sky. It is not necessary to ask, What is horticulture? What are its influences, its tendencies and its teachings? I shall not refer to its commercial advantages, though these be of great importance.

THE TRUE VALUE.

But horticulture affects the innermost character of a people. Its whole tendency is of a conservative and refining character, which attaches a people to the land in which they dwell. It not only adorns but it builds up and establishes the country. Its special mission is to beautify and ornament and make attractive country life. It takes hold of the social, the intellectual, and nourishes, while it gives rest and peace to the head and heart. It attracts from the city to the country the very best elements of the city. The devotees of politics and the professions turn to it for solace and refinement. Sir, much ridicule was made of Horace Greeley's farm, but if he had abided by its chastening influences he might be living to-day. It is said that the salary of our Secretary of State is inadequate to support his country place in Vermont. Mr. Evarts will tell you it is the best investment he makes. We have seen no reference to the horticultural attainments of the lamented and distinguished jurist, Judge Emmons, but it is a well-known fact that he built up and sustained an establishment which, in his prime, was an honor to him and to the county and State in which he lived.

THE ADVANTAGE TO THE CITY.

And it was found that it was a charm added to city life, and that the influence of trees and flowers, of fountains and parks, was purifying and restraining, and the bringing of fruits and flowers to the city table, at all seasons of the year, was combining the advantages of city and country life, and throwing these advantages open and into the hands of the rich and the poor.

ITS ORGANIZATION.

Thus it was sought to prove, first, the fact that we had the capacity for a broad system of horticulture, and then that we could sustain it; and to enforce this, and to teach the principles of this, one of the highest as it is one of the most difficult of the useful arts, we combined and organized this society, so that its main object has been educational, to teach and to be taught. To accomplish this the society has brought in as tributaries and aids all congenial arts and sciences; trained men have been called to instruct us; practical men have thronged to our meetings and have given us their experience; a generous zeal has been aroused in all classes of men and women to establish the society and promote its objects; so that the prospect for success was never brighter than it is to-day.

THE FUTURE.

No man can travel through this State and not get an inkling of its destiny in horticulture. Forty miles east of the Michigan lake shore is a city and county that is a growing type of what is to be. There are entire counties that fifty years from now will be scenes of rural loveliness and magnificence. I have often compared the advantages of this lake shore with those of my native State, with the shore of Long Island, with the banks of the Connecticut and of the Hudson. Give this one-half the years of settlement with those, and I predict that this shore, from New Buffalo north, especially through the peach and tender fruit growing counties, will be lined with cottages and villas, the homes of a happy and cultured people, and that the country will be divided into plantations of small farms and orchards that will illustrate American husbandry and American life in its very best forms and habits.

Lord Bacon did very nearly say a true thing when he declared that "nations in their march in civilization began with erecting stately edifices and ended with highly cultivated gardens." I hope for the sake of our American cities that the day of stately edifices is gone, and that the day of cultivated gardens has come. Standing here at this mournful and disastrous outcome of shoddy and extravagance, of wild speculation and the maddening rush for wealth which has brought desolation to the land, I ask an intelligent people if there is not need of the benign, healthful, and conservative influence of our cause to be spread abroad throughout the land? When we hear this melancholy wail go up from the homes of the country, that the sons and daughters have deserted the homesteads of their fathers and mothers for the glare and glitter of the cities, is it not time to build up the moral and social force contained in this horticultural advantage?

Hence the educational element of this society is the most valuable and to be the most cherished.

It was desirable to establish this characteristic of our state as one that is fixed and permanent, for with it and upon it were to be built such qualities in the people as would refine and ennoble them.

THE ADVANTAGE TO BE DEVELOPED.

It seemed desirable to develop our advantage. If we could add the fine art of horticulture to our system of agriculture, the combination would be complete as well as beneficent. It would be adding music, painting, and sculpture to the toil and drudgery of daily life. There was a special reason for the de-

velopment of this interest, for, as I have already hinted, it was apparent that this was a "fast" age, and that the tendency was to build up the city at the expense of the country. A counteracting influence was needed, and no better one could be found.

The first question for general discussion was:

"HOW FAR CAN WE CONTROL THE BEARING YEAR IN OUR APPLE ORCHARD?"

Mr. Garfield.—I was led to choose this question for your consideration by a remark made to me a few days since by J. N. Smith, of Ingham county, who is an extensive orchardist. He said he had succeeded in controlling the bearing year of a young orchard by judiciously removing fruit, and careful summer pruning, so that this season, one of general unfruitfulness among orchards in the State, was the bearing year with him. He had accomplished this against the predisposition of the orchard which tended to bear its great crop last season. It seemed to him that this was quite an important matter, and worthy of careful consideration. It is a well known fact that the off year with a majority of orchards occurs at the same time, and if there is any method by which with the exercise of some care we can change this habit the reward will be ample and sure, for we may rely with a great deal of certainty upon the fact that if it requires some attention the majority of orchards will not receive it, and the added labor will not be in vain because of severe competition.

Prof. Beal.—I have known in a number of instances where trees upon small places have been so controlled in their bearing year as to yield fruit at the will of the owner, simply by the removal of blossoms or young fruit at proper times. I believe the best way, however, is to enrich the soil sufficiently to bear every year, and control the number of specimens by thinning so as to relieve the trees from the danger of over bearing any one year. The off year is the year for recuperation after the tree has been over-worked without enough to eat. Now if it be well fed and not allowed to do more than it is able, fruit may be had every year in sufficient abundance.

J. P. Thompson.—This seems to be a peach year and not an apple year. Is there any significance in this, and is there any way of accounting for it?

Prof. Beal.—Without being able to answer Mr. Thompson's inquiry, I wish to add a word to what I have already said. I have been crossing some apples this year, and in the case of trees where nearly all the blossoms were blasted quite a large number of the crossed blossoms developed fruit, seeming to indicate that pollen from other varieties and from other localities had a greater power than that from the same blossom and tree.

Mr. Garfield.—I have noticed this in my own experiments among apples, in one instance the crossed specimens on a Talman Sweet that blossomed full, were the only ones that set apples.

Prof. Beal.—This may not indicate a practical method of controlling the setting of fruit, but is a fact worth noticing, and is of scientific importance.

President Lyon.—I have recently received a communication from a man in Lapeer county, which contains a plan for controlling the bearing of fruit trees; it was written to me as a secret. It is a plan that will undoubtedly succeed; in truth, my own experience has proved it a successful method. But whether

it is an advisable system or will ever become popular may well be questioned. But for all practical purposes Prof. Beal's plan of feeding trees well, so they have a plenty to live upon, is the one to be relied upon for good results. I understand it is by this method that Mr. Pell, on the Hudson River, has been enabled to make so large profits from his orchard. He is the man, as many of you may know, who has shipped such large quantities of Newtown Pippins to Europe, from his orchard of 2,000 trees. As a general rule this orchard has borne fair crops continuously. The process may be criticised from its rendering the trees short lived. Where trees are made to bear quantities of fruit each year it must be an exhausting process, but there is no doubt but in the end it will pay better to make and take the crops, setting new orchards when the old ones begin to decline, always remembering to thin the fruit in such a manner as to secure sufficient annual growth to maintain the vigor of the trees as completely as possible.

Mr. Chapman.—I must say that my experience will not support the gentleman in his remarks. I have fed one of my orchards liberally and without the result mentioned by Mr. Lyon. The bearing year remains as before; one year I will have a great abundance of apples and the next scarcely enough to eat.

Mr. Merriman.—It is a common thing to produce a magnificent growth of wood through the addition of manures, but often there is no evidence of increased production of fruit.

Mr. Lyon.—It is a well known fact that the kind of fertilizer makes a great deal of difference with the result produced. Certain combinations have been employed in the production of double flowers successfully, and no doubt if careful investigation be made the increased fruitfulness of our orchards from the employment of manures may not be guess work but entirely under our control. The thing to be sought after is such a control of fertilizers as to produce the result we desire, whether wood or fruit. Prof. Beal's experience teaches us that soils abounding in vegetable material known as black loam, will if sown to wheat produce a great growth of straw, and often little grain. Barn yard manure added will only increase this tendency, while on the other hand, land deficient in vegetable matter needs this kind of fertilizer; the rich loamy soil will produce in trees a great growth of wood, and requires some sort of mineral fertilizer.

P. C. Davis, Kalamazoo.—I would like to inquire what is the effect of cultivation on young orchards. My own impression has been that cultivating young trees tended to a great growth of wood and the time of fruiting was thus put off to a later date. I have known fruitfulness induced by checking the growth of a single limb on a tree through the agency of a weight hung upon it. It is a question whether this is a very practicable method however.

Mr. Adams.—I have been waiting very anxiously for our worthy president to tell us of that method by which he had induced fruitfulness in trees successfully—not the secret that was reposed in keeping by the gentleman at Lapeer. I would not have him divulge that for the world; but the same method he has tried himself and that he can certainly open to us.

Mr. Lyon.—I have no serious compunctions about giving voice to the secret even as it has already been mentioned in connection with this discussion. It consists in twisting or bending a branch in such a manner as to check the growth and thus stimulate fruitfulness. I have seen it done repeatedly and have practiced it myself, but of course you all can see that it is a matter of no considerable importance to the practical fruit grower. I have seen the Bald-

win apple here induced to regular and constant bearing by judicious thinning of the fruit immediately after setting. The Baldwin has a marked tendency to alternate bearing, produced, of course, by the production of excessive crops which impairs the vitality of the tree, and hence nature asserts her right to a period for recuperation. The same process can be made to succeed with any variety, the object being to maintain a proportionate amount of growth in twig and fruit, thus keeping up the vigor of the tree.

Mr. Adams.—I would like to ask Prof. Beal when to thin apples.

Prof. Beal.—Take the apples off as small as possible, it would be better even to remove a proportion of the blossoms or even fruit buds if practicable; but taking into consideration the matter of economy, I should remove the fruit as soon as it sets.

W. H. Hurlbut, South Haven.—I wish to state a fact in this connection. Nine years ago I had a Baldwin apple tree so injured by winter that at the base the bark separated from the wood and between them it was black and apparently dead for sixteen inches. I built a mound of sand about the place so as to entirely cover it. The tree recovered, and from that day to this, although the growth has been slow, it has been healthy and vigorous and further without manure or tillage for the past six years it has borne a regular crop of fine apples.

Mr. Engle, Paw Paw.—I have no reason to believe from my own experience that it is possible to regulate the bearing of a tree in any measure, as to its regularity by cultivation.

SECOND TOPIC.—WHAT NATIVE TREES AND SHRUBS ARE BEST ADAPTED TO PLANTATIONS ABOUT A HOME?

Prof. Beal.—Had I given some thought previous to coming here, to this topic, I should have been delighted to present my views upon what I deem a very important question for our consideration. I have at different times in connection with teaching landscape gardening to my classes, given a good deal of attention to tests of our indigenous plants for planting on home grounds and gardens, and while I enumerate from memory I may leave out some of the very best. [Those marked with a star are the ones which the Professor ranks the highest.—Sec'y.] There are many good trees, and very few poor ones, if properly treated, in our forests, that may be taken to our homes. I begin by naming the *yellow oak, the one with the deeply cleft leaves; if given opportunity it will make a magnificent tree for large grounds. The black oak is not so good, but worthy of a place. The *American elm, with its drooping branches; the *basswood or linden, with its rich foliage, and the grand *tulip tree or whitewood are all suited to the lawn or park. We should not forget the service or junberry, which I rank quite as high as an ornamental tree. There is a tree having no enviable reputation in connection with the school-room that to me, in its proper place, has few equals for ornamental purposes; I refer to the *blue beech. As I have seen it bending over streams and ponds of water in its native haunts, and more recently at Central Park, New York, I am willing to give it a place among the very best of our native trees. It requires a rich, damp soil to bring out all its beauty, and proximity to a sheet or stream of water enhances its appropriateness. All the maples are good. The *sugar maple is more commonly employed, but the red and silver species, when we

consider the autumn tints, are beautiful. *Acer spicatum* and *Acer Pennsylvanicum*, the former with flowers erect and the latter with drooping flowers, although not so common, are fine trees, and belong to the same family with the maples already mentioned. The *white ash with its quick habit of growth, straight trunk, and delicate foliage, is a good tree for the grounds about a home. The bladder nut, hop tree, paw-paw, and Kentucky coffee tree all have worthy peculiarities that demand our attention. The American chestnut upon dry sandy or gravel soil, where it has plenty of room to spread, makes a good specimen. The beech is slow in growth and makes a symmetrical attractive specimen, if cultivated or mulched, but in the lawn where a compact sod covers the ground beneath, it often does poorly on account of its feeding roots being so near the surface. The hackberry is very appropriate for low grounds. The black walnut and buttonwood are well adapted for rich soils, and are of rapid growth. The ash-leaved maple, Judas tree, *Cornus florida* (dogwood), *Cornus alternifolia*, sassafras and buckeye are all natives of worth. There is one other deciduous tree rarely found in our yards, that I think of now as one of the very best, the *pepperidge or sour gum tree: its beautiful green leaves in summer and fiery red in autumn make it quite an acquisition. Among evergreens the *red or Norway pine, the *white pine, and *white spruce, I can recommend without hesitancy. The arbor vitae for certain purposes is quite appropriate, while the *hemlock spruce is unsurpassed for either specimen trees or hedging purposes. The balsam fir is fine while young, but has a tendency to lose its lower branches. The red cedar for cutting and shaping into various forms is the best tree we have. I ought not to have neglected the choke cherry for ornamental purposes, in my estimation it deserves a place. The only objection I know of is that it is liable to sprout somewhat at the root. Of course there are many others, but if good use were made of those already mentioned I am satisfied there would be a great improvement.

Pres. Lyon.—Will Prof. Beal tell us the difference between the Norway pine and the Austrian pine. I confess that I am unable to distinguish them.

Prof. Beal.—To a casual observer while young there might be nothing to distinguish them. When of some age the Norway assumes a peculiar red appearance on the bark, while the Austrian is gray.

P. C. Davis.—I was very much interested in a pine grove I saw at Clam Lake, it taught me a lesson in the massing of evergreens. The rich color and fine foliage next the water of the lake made it one of the most beautiful tree scenes I ever beheld.

Mr. Engel.—I would strike from Prof. Beal's list the Paw Paw, not because it has not beauty, but because there is a serious practical objection to its employment in yards. It sprouts as badly as a poplar, making it a real pest when once established.

Mr. Glidden.—When there is a great feast of good things it is difficult which to choose, and among the long list of trees and shrubs they are all so good that when we are compelled to take our choice for limited plantations we find some difficulty in the selection. The maples, elms and blackwalnuts it seems to me commend themselves to all planters, and stand forth as the leading species for this purpose, they can be so easily obtained and bear removal so well. Some one in the audience said the last named trees were unfit for cultivation anywhere near walks or drives on account of the multitude of worms that were always found feeding upon them.

Mr. Pierce, South Haven.—One tree was left out of Prof. Beal's list that to

me is one of the best. I refer to the common Tamarack or American Larch. In any collection this tree should not be overlooked.

Wednesday Morning.

The first work laid out on the programme for Wednesday was the consideration of a paper read before the Pontiac meeting in February by President Lyon, in which he recommended that the State be divided up into sections and a catalogue of varieties be selected for each section with appropriate notes upon each variety, and signs indicating for what purpose valuable. This matter was referred to a special committee, which presented their report as follows:

Mr. President and Gentlemen of the State Pomological Society:

During the last meeting of our society at Pontiac, Mr. Lyon read a paper upon the topic "The State Pomological Society vs. Fruit Lists" which embodied a number of valuable suggestions and important recommendations upon matters connected with the formation of a permanent fruit catalogue. Your committee to whom this paper was referred, have had the same under careful consideration and unanimously agree to recommend that the plan of forming a catalogue of varieties therein suggested be adopted by the society. Further your committee recommend the appointment of a standing committee of three by the President of the society, which shall be denominated "The Committee on Fruit Catalogue," said committee to have the entire formation of the new catalogue under its care and control, and to furnish a copy of the same as far as completed for publication in the annual proceedings of the society, from year to year. It seemed to the committee that this was a very important part of the society's work and deserving of the most careful and discreet attention and management, and in submitting these recommendations they feel to urge that the committee chosen shall be composed of men who can act for a series of years, as any change in men might involve a possible change in policy which would check the continued successful work of making the catalogue.

Respectfully submitted.

H. DALE ADAMS,
C. N. MERRIMAN,
A. G. GULLEY.

The first topic for discussion in the morning session was expected to be opened by Mr. Bradfield of Ada, but in his absence an available man was found in Mr. Winchester of St. Joseph, who led upon the question,

WHAT ARE THE PROMINENT ERRORS MADE BY BEGINNERS IN GRAPE CULTURE?

Mr. Winchester of St. Joseph.—My observation and experience have shown me that the leading errors of beginners in grape culture are similar to those made in the apple orchard, and the worst one of all is the choice of too many varieties for planting.

It is a nice thing to have a large number of sorts upon one place from which to choose the best for eating. It is quite a satisfaction, to say "I raise twenty-five varieties of grapes and find the Ionis the best suited to my palate." But those who raise grapes in quantity grow them for money, and the satisfaction

that comes to them is through the increasing corpulency of the pocket-book. It is quite desirable that our farmers through the country raise grapes for their own use, and it is all folly for them to raise a vine of a kind and ten or fifteen kinds. They will not give each sort the peculiar culture adapted to it any way, and it would be far better that some one sort be chosen and that cared for. I am satisfied that grape growing can be made profitable, and there is plenty of room to expand without danger of over-production. There is no better crop of fruit to raise, nor more profitable if well managed.

Mr. Dyckman.—What varieties would you recommend for culture for profit.

Mr. Winchester.—I am some like Mr. Buell on varieties of apples to plant. I remember he said at one time in answer to what apples he would plant, that he would select in a thousand trees nine hundred Red Canadas, and then one hundred more Red Canadas. The Concord grape is the variety for profit; it is increasing in popularity every day. I have had abundant opportunity to watch the development of the Chicago market and the Concord grape is in greater demand there than ever before.

Mr. Lannin, South Haven.—It is my impression that there are grave errors made by beginners in the matter of pruning, and I would like Mr. Winchester to tell us just what plan he would now pursue.

Mr. Winchester.—The great error it seems to me among extensive growers of the grape is that they do not give the roots enough to do. The pruning is too short. I believe vines should be put further apart and the arms allowed to extend eight feet at least each way. More grapes will be grown and the vines will be kept more healthy. You will see by this that I use trellises rather than stakes upon which to train my grapes.

Mr. Chapman of Hillsdale.—I would like to inquire if it is profitable to pinch off the branches when the grape vines are fruiting?

Mr. Winchester.—The only summer pruning necessary is to pinch off the tops when they reach the upper wire of the trellis.

Prof. Beal.—I am satisfied the gentleman is quite correct in leaving lots of foliage. The work of the leaves in developing the fruit, even if the direct rays of sun are excluded, is greater than sunlight upon a partially defoliated vine.

Mr. Engel of Paw Paw.—We will not all agree upon the errors made by the beginners, for if I were to suggest one it would be the making of a trellis. I have for twelve years practiced stake training with unbounded success. I call success the raising of large crops of grapes continuously at the least expense. I use one stake for each vine practicing the usual system of allowing two canes for each stake, and often depending on what are termed water sprouts for canes. My vines are put six feet apart. The proof of my system lies in my crops and the healthy vigor of my vines.

Mr. Merriman of Grand Rapids.—The principal errors, the error of all errors made in our climate, I apprehend, is in managing vines so as not to cover them in winter. By a proper system vines can be so arranged as to be put under a little earth in winter and the crops ensured, while if the vines remain unprotected on the trellis during our severe winters we suffer in the diminution of our crops and often in the material injury of our vines.

Mr. Winchester.—This may be the case in the interior of the State, but upon our Lake Shore we need apprehend no difficulty from that cause, and our system of training needs no modifications on account of severe winters with my grape, the Concord. In regard to distance apart for vines, my neighbor, Mr.

John Whittlesey, has a plain example of what I wish to enforce. He has a single vine extending fifty feet on a trellis and from it he cuts more grapes than from the same length of trellis where his vines are eight feet apart.

Mr. Strong, of South Haven.—I have had a good deal of experience with grapes farther west, and am of the conviction that grapes grown near the ground are of far better quality than those grown out on the ends of long vines.

Mr. Adams.—According to Mr. Whittlesey I have made a grave error in planting a vineyard with the vines only six feet apart, and the most judicious thing I can do when I go home will be to cut out every other one.

Mr. Winchester.—No, I would not advise that, it takes time to grow a good arm from a vine, and my advice would be to take every other vine and grow gradually an arm twelve feet in length, but in the mean time raise some grapes from all the vines. After the arm is extended to its proper length and is in healthy condition then cut out the alternate vine.

Mr. Dyckman, of South Haven.—I am a peach man, and am not supposed to know much about grapes, and the supposition is pretty nearly correct, but as I have been called out I will speak of one error that may be committed by beginners in peach culture. The rose beetle has come among us in great numbers, and the little fellows like almost any thing to eat, but still have some choice when there is an opportunity to exercise it. They like grapes for instance, better than peaches, and my vineyard is used now as a trap for the rose chafer. I send my little boys over the grape vines, they gather up the beetles by the hundreds and thus save my peach orchard from their ravages. It is easier gathering them also from the vines, hence my advice is to raise grape vines for this purpose.

The next question upon the programme for discussion was

THE MOLE—WHAT IS HE GOOD FOR?

The discussion was opened with a short paper by Prof. Cook, as follows:

Some years since I was urged to write a paper for the agricultural report of one of our States, by one of the then ablest agricultural writers of the country. The paper, which contained a word of hearty commendation of my friend—aye, and the friend of every agriculturist, whether he appreciates the facts or no—the mole, was completed and forwarded to the able compiler, only to receive ignominious rejection; all forsooth because this little mammal, the mole, had received a just meed of praise.

The first part of this experience is being repeated at this time, but that the second part is to be re-enacted, there is no reason to fear. I know your Secretary too well to believe that he would exclude matter, even though not in full accord with his own opinions.

But let us examine into the status of the mole and see how the case stands, and then give a verdict accordingly.

HE DEVOURS INSECTS.

The mole belongs to the order of mammals known as Insectivora, which includes the shrews, English hedgehog, and our moles. The name of the order is significant, as these animals are, without exception, par excellence insect eaters. It fact, their teeth are of themselves vouchers as to their character

These organs are terminated with sharp pointed or conical tubercles, just fitted to crush the hard crust which envelopes their insect prey. As the cutting edge of a lion's tooth betokens a meat diet, the grinding surface of a horse's demands a vegetable regimen, just as surely does the pointed teeth of the moles tell of insects as an exclusive food.

Although the structural peculiarity as described above is quite enough to decide the whole question, yet I will further give the weight of research to aid in the decision.

ANNIHILATES GRUBS AND CATERPILLARS.

I have examined the stomachs of all the moles I have ever had in my possession, and always to find, not whole insects (their digestion is too active for that), but the head-shields of numerous grubs and caterpillars. In such an examination about a year since I was exceedingly surprised at the number of such helmets which confronted me. I felt sure that each was the scalp of a white grub, and as I gazed at them I could but think in sorrowful mood of the friend I had sacrificed, and ponder the sad tale of the "Ancient Mariner" and the slain albatross.

FEASTS RAVENOUSLY ON CUT WORMS.

What worse enemies have we than the cut worms, the white grubs, and the wire worms? How can we estimate the worth of a friend who is never weary in the good work of their extermination? The injury we receive from these fell destroyers is enormous. They work in darkness and concealment, and are almost proof against artificial remedies. They are in great part protected from bird and parasite, and were it not for mole and shrew, would soon turn our world into a barren waste.

A TRUE FRIEND.

You see the evil work of the mole, and have good reason to appreciate it. His much greater benefits are all hidden, and thus you know not of them, and how can you appreciate. To aid you to do this let me state that the mole can live but a few hours without food, before it will starve, indicating the activity of its nutrition, and the great amount of food required.

TRIFLING TROUBLES.

Now let us look at the evil deeds of the mole. They are all summed up in the mounds and earthen windows of which he is the builder. Then, too, only in a light soil. The mounds dull the scythe or knives of the mower, but have we not good and abundant grind-stones, and is it not better to spend a little time grinding knives than to have grinding poverty confronting us at all times because of the devastation of grub and caterpillar?

The gardener is vexed at the disfiguring ridges, or an upturned row of crocuses, or balsams. Yet the ridges are easily raked down, and surely it is better to miss a single row somewhat injured than to have all hopelessly cut off by cut worms.

SPARE HIM AND PRESERVE YOUR CROPS.

The French Agricultural Bureau prohibits, by a heavy fine, the killing of the allied hedgehog. It is easy to kill our moles by poisoning them. Let us never advise or practice this, lest we become scourged like the locust invaded plains

of the treeless and birdless west, and like them have to appeal to government for aid.

With the above facts, not fancies or surmises, before you, and the further statement that nearly all our insect pests sojourn for some period of their lives in the earth, ready to be crushed by the ever rapacious moles, I feel quite safe in trusting my case to an intelligent and fair-minded jury as that constituted by the State Pomological Society.

Prof. Beal.—I have experimented, observed, and thought a great deal over this mole question, and must say I cannot take the radical ground occupied by my brother professor. I have had too many choice plants injured by this little pest to believe him altogether harmless or worthy of our careful preservation. And again I am satisfied that no wholesale devastation would follow an entire extermination of the mole. We must remember that the mole does not distinguish between injurious and beneficial insects, so that while he is prowling about rooting up our bulbs, undermining our choice strawberries, and stirring up the lawn, we must not forget that perhaps he is also destroying large numbers of our best friends. I can see two sides to this question, and believe that the moles destroy a great many insect enemies, but after weighing the matter carefully, I have decided to get hold of the best trap I can find and close up the career of some of them.

Mr. Satterlee.—I consider the mole a nuisance on the whole, and am willing to cast my vote against him. I do not under-estimate his good qualities, but feel that the burden of testimony in my own experience and observation is against him.

Mr. Lannin.—I am glad to hear this mole question discussed, and wish to add a bit of my own experience. I had a piece of pretty heavy clay ground which a few years ago I thoroughly fitted for pear trees. In its preparation I employed a large amount of barnyard manure. Very soon I noticed that several of my pear trees were doing poorly, almost dying. I am a man that lives in my orchard, and to see these pretty trees dying touched my heart. Previously I had noticed that the moles were working vigorously in the soil, but to what purpose I do not know. But after investigating I found two facts, that in putting so much barnyard manure on my land I had increased, to an alarming extent, the angle-worms. My ground was full of them. The moles were after the angle worms, and without any show of malice had perfectly undermined a number of my trees, nearly destroying them before I had found out the cause. However they cleaned out the angle worms; by further experiment I found the more manure I added, the more angle worms were bred, and the more moles tunneled the ground until I was near losing my young orchard. Meanwhile I was by no means free from the miserable cut-worms upon this same field. I think my experience has proved several points:

1. Moles are by no means an unalloyed good.
2. They will work in clay soil.
3. They may not always choose to eat our greatest enemies in the insect line when within their reach.

I now turn my hogs into the orchard, and they do pretty good service in eating angle worms, cut worms, and moles.

Mr. Winchester.—I am satisfied that the diet of moles is not confined to things outside of vegetables. They will certainly eat tender bulbs. They do more than to destroy plants by undermining them, for they eat them.

Mr. Chapman.—I am willing to add my testimony to that of the gentleman who has just spoken. I know the mole will eat tulip and hyacinth bulbs from my own observations.

Mr. Satterlee.—It occurs to me that these gentlemen must refer to another animal, a rodent, which I know as the short-tailed field mouse; this fellow will live upon bulbs and roots.

Mr. Adams.—I cannot speak for others, but I feel qualified to identify a mole or a meadow mouse, and I know that the true mole will eat corn after it has been softened in the earth. They are omnivorous like the crow and raven. These birds prefer carrion, but will eat corn.

Mr. Glidden.—I can bear Mr. Adams out in the statement that the mole will eat corn. I have known one to follow a row of sweet corn some distance and take out every kernel.

Mr. Engel.—I have had moles eat some distance in a row of peach pits or chestnuts, taking them clean.

Mr. Fox.—I have known corn and chestnuts to be taken by moles to considerable extent.

Mr. Hurlbut.—Every farmer can vouch for the truth of Prof. Cook's statement that the digestion of the mole is very rapid, and this is why I account for his not finding any sign of vegetable matter in the mole's stomach. I claim that it is impossible for one to tell exactly what an animal will eat under necessity by the appearance of the teeth. The raccoon and the opossum are carnivorous animals, but those who know them best have abundant reason to know that both animals will subsist in a healthy condition upon a corn diet, and from my own observation I am led to believe that the mole will subsist upon bulbs and softened corn in times of necessity.

Mr. Garfield.—This matter can be very easily settled by placing a mole in a box of dirt with plenty of bulbs and soft corn; if he starves we would naturally conclude that the little fellow would rather die than go outside of his normal food.

This discussion having occupied more than its allotted time, the society next listened to a paper on

THE BEST PEARS FOR WESTERN MICHIGAN.

BY C. ENGLE, OF PAW PAW.

The six best pears for Western Michigan, which I shall name, take precedence in the order in which they are named. I have depended wholly on my own judgment, founded on my own experience after testing some fifty sorts, which Downing rates from good to best.

Freedom from blight has been the first consideration, or perhaps I should say comparative freedom, and next quality and productiveness, neither would I set a tree whose fruit was not good for both market and dessert.

Naming, as I do, without regard to the opinion of others, it is hardly to be expected that you will agree with me in all, or perhaps a greater part; but it will at least call out discussion.

I shall name them in the following order: Beurre d'Anjou, Bartlett, Blood-good, Beurre Gris d'Iliver, Lawrence and Duchess d'Angouleme.

With me *Beurre d'Anjou* has been almost entirely free from blight, and is truly a noble pear both in tree and fruit.

Bartlett, which stands next on the list, should be first for a profitable market sort were it not for its blighting tendencies.

Perhaps I can do no better for the *Bloodgood* than to quote as follows from Downing: "It is the highest flavored of all early pears, and deserves a place even in the smallest garden. The tree grows moderately fast and bears early and regularly; fruit medium and flesh buttery and melting, with a rich, sugary, highly aromatic flavor." All of which I can heartily endorse, and further add that is a profitable market sort. When the committee on orchards visited my place six years ago I was told the *Bloodgood* was properly an amateur pear, on the strength of which I top-grafted several of the trees with the *Bartlett*. Before the grafts came into bearing I found my mistake, and so left the limbs to grow which I had designed to cut away. The grafts have since all blighted, while the original trees have remained healthy. Marketed in Detroit, the pears have seldom sold under \$2 per box, or \$6 per bushel. I only regret I did not set more of them.

The *Beurre Gris d'Hiver Nouveau* is a splendid pear every way, and with the *Lawrence* about fills the bill for winter pears. The only trouble is, neither is a late keeper; but for market I think it just as well, as they sell for as good a price at their time of ripening as at a later season.

I shall say nothing for the *Duchess*, except that with me it is a profitable pear to grow for market.

There are two, perhaps three other pears, which I should like to speak a good word for. They are the *Dix*, *Howell*, and *Clapp's Favorite*. I have ten trees of the *Dix*, set out eight years ago, and they have fruited three years past. The trees are entirely free from blight, and the fruit good every way. *Howell* is splendid in both tree and fruit, and if the trees prove as healthy as their habits indicate, I would cut off the last named pear on the list and put *Howell* in its place.

I need not sing any praises in favor of the fruit of *Clapp's Favorite*, as it has received more in that direction I believe than any pear now grown. My own trees have been planted only four years, so that I cannot speak positively of their healthiness, but think from their habits, they will prove quite liable to the blight.

The next question for discussion was:

HOW CAN WE MAKE THE BEST USE OF EVERGREENS IN PROTECTING OUR ORCHARDS?

Mr. Garfield.—Inasmuch as our President has given a great deal of thought to this matter and has already written many good things upon the subject, I would, for one, enjoy hearing him open this discussion.

Mr. Lyon.—I dislike to express my convictions upon a question of so great importance without previously collecting my thoughts together, but I recollect quite vividly when I came to this lake shore that there was a prevailing opinion among the orchardists here that no protection was needed from the wind, that the sooner the timber was removed entirely between the lake and the orchard the better. The lake was looked upon with the most perfect trust as a mother

that would protect from any kind of a blast, and the less obstruction between her and the fruit trees the better. But judging from the growing practice along the shore, I am convinced that there is a conviction among the people that a shield of tree growth of some description is a necessary accompaniment to successful fruit culture. If we require something of the kind here, where location near so large a body of water is so much in our favor, how important a matter it must become farther inland where they have no such modifying element. The full force of our strongest winds has power to do incalculable damage in many ways. It injures foliage, drops the fruit, breaks off limbs and buds, piles up the sand, and in various other ways troubles the orchardist. I have in mind now an orchard where I now board that in 1873 took the first premium in its class, it is exposed to the full force of the wind and has the entire breadth of Lake Michigan to modify the temperature of the air moving from that direction, but the orchard is a ruin, while others that might be considered less favored from their distance from the lake remain in good vigor. The question recurs to what will we do in this matter of protection, and if we use evergreens, how shall we employ them? Evergreens are of slow growth generally, and those recently planted can be of very little benefit as a protection, so that the return for expenditure is not an immediate one. My own plan would be not to confine the planting to evergreens solely, but to use some quick growing deciduous trees in connection therewith. The Lombardy poplar is no friend of mine, I never was enamored with its habit of growth, but it develops so rapidly that in the case mentioned with evergreens it might be admissible until the evergreens get sufficiently developed to serve the purpose for which they were planted. Of course soil and location will have everything to do with the selection of appropriate trees for this purpose. It must not be forgotten, too, that evergreens until well up in the world will not stand the blowing sand or severe winds, and therefore require themselves the protection of hardy deciduous trees for a time. However, after attaining some size the evergreens usually employed are quite hardy and serve an excellent purpose. Among varieties I would select for the purpose of protection, as first the Norway Spruce, which seems wonderfully adapted to all soils in our State. Upon light soils the White Pine is a quick grower comparatively and forms an excellent barrier, and is very beautiful. For lower growth Arbor Vitæ is good, and our native hemlock is most beautiful of all.

Mr. Anderson.—I would like to inquire about the Scotch fir. In my native country it is considered remarkably good for a barrier to the wind, and is extremely hardy.

Mr. Lyon.—What we know as Scotch pine is a good tree for this purpose; however, after attaining some age it is liable to grow with rather an open head.

Mr. Adams.—Next to the Norway spruce I would number the Austrian pine, which is a pretty rapid grower, a grand tree, and as hardy as anything we can secure for the purpose.

Mr. Williams, of Saugatuck.—Some years ago I consulted Robt. Douglass & Sons as to the best evergreens to plant next the lake on our drifting sands, and they recommended, above all others, the Scotch pine, but since then I have noticed old trees of twenty or twenty-five years standing of this variety, and the limbs seem to have a tendency to die out and leave the tree scraggy and unsightly in appearance.

Mr. Glidden.—I saw near St. Joseph a shield of evergreen and deciduous

trees planted in the manner indicated by our President, that made a fine appearance and served an admirable purpose.

Mr. Winchester.—A long time ago we saw the necessity of employing screens and began planting the red cedar largely, which seems admirably suited to our soil and location. It grows rapidly, and by use of shears can be put into any desirable form. The only serious objection we make to it is that the foliage loses its rich green color in winter and assumes a brownish hue which is not so pleasing to the eye.

We look with great favor upon any form of hedges and screens, and know from experience that we do get a quick return from even evergreen screens. I have seen the first year after setting a small evergreen hedge the snow held for six rods to the leeward, and thus making a first-class protection for small plants that would otherwise have suffered greatly from the blowing away of this natural element of protection.

Mr. Thompson.—For years I have been interested in this matter of protection, but my observations have been confined largely to the interior of the State, and I believe I can see quite a change in the opinions of people in the matter of woodland or evergreen protection. The best observers have from bitter experience discarded the idea of the desirability of having other protection than *altitude* for their tenderer fruits, and even for apples. I am convinced that the surest thing in the way of protection is to get them up as high as possible and give the benefit of air in motion. I could enumerate many instances where to all appearances orchards were snuggled warmly away from severe winds, that have suffered the worst from our severe winters. My own conviction is that we want as little screen as possible in the way of trees, if we can only get high enough up in the air.

Mr. Engle.—I agree most fully with Mr. Thompson in the matter of *altitude*: but where at one time I considered altitude everything now I wish something more. Experience has shown me that the roots of our trees require careful protection. The snow needs to be retained in as much quantity as possible, and sweeping winds prevent this. Acting up to my convictions I have set over a mile of evergreen screen on the west side of my orchard and through it at intervals of twenty rods, and believe this the best thing I can do after I had secured what altitude I could get. The plants in these screens are eight feet apart.

Mr. Stearns.—Altitude and timber protection should certainly go together. A little of my experience may be admissible. Three years ago we planted largely of pear grafts; on a portion of the field there was toward the west a barrier of young oaks that held the snow over the grafts, while on the other portion the wind had a sweep. In the former instance the young trees came out all right, while with the free sweep of the wind the grafts were killed root and branch. Again, my pear orchard is protected on the west by my apple orchard, while a neighbor's orchard, set at same time, with no such protection, has not done nearly so well.

Mr. Adams.—One of the important points in protection by evergreens and timber is that the air shall have an outlet. It is by no means good sense to cut a hole out of a forest and set an orchard in it. An instance illustrating this occurred in an orchard in Calhoun county two years ago, when an orchard on high ground but surrounded by woods, was injured beyond recuperation by the winter. A hole in the woods will hold cold air like a valley, and there must be a free outlet to be at all safe.

Mr. Merriman.—I have in mind a peach orchard north of Grand Rapids that was nicely screened on the west by oak and hickory, which was severely injured, almost destroyed, one winter, while on the same farm and the same elevation, another orchard open to the wind from the same quarter was saved. My observation leads me to the belief that dense protection either from evergreens or other screens is not what we want, for every orchard needs a good circulation of air, and although I believe in plantations of evergreens on the west and southwest of orchards, still these should be only for the purpose of checking the wind, and not to produce a calm in the orchard. An orchard of Mr. Ferry's, near Grand Haven, is an illustration of this; at first his timber screen was too thick and his reward was injury to his orchard, but by subsequent thinning of the screen he produced just the effect desired, of stopping the main force of the wind without limiting the circulation of air.

Mr. Glidden.—As far as holding the snow is concerned I am in favor of evergreens to assist in the process, but I shall be very slow to believe that any change of temperature in the orchard will result from thus checking the wind. The analogy between animal and vegetable life will not work in this case. A man will suffer intensely from a wind but little below freezing point, but a tree is not affected in the same way. It has no nerves to be influenced, and is not injured as far as temperature is concerned more in a wind than without the wind.

Mr. Garfield.—Still it is true, nevertheless, that the temperature of a thermometer is sensibly influenced by a cold wind. The heat in anything is removed by a driving wind more than by still cold air. Why not in peach buds as truly as in a sheep?

Mr. Dyckman.—The important point on the lake shore is to protect the surface of the ground, and whatever will hold the snow on, whether it be corn-stubble or evergreens, serves the only purpose we need to consider.

Mr. Hurlbut.—There are just two points to be looked at in this matter. First, thorough and complete atmospheric drainage, which must be accomplished by having an outlet for the cold air and a broad level tract so that the coldest air can have abundant opportunity to settle away from the orchard; second, there must be something on the ground to hold the snow, it may be corn-stalks, oats, rye, or a screen of evergreens. But beyond this I see no reason for any means of protection in the fruit belt.

Mr. Merriman.—My own idea of a screen for an orchard would be a low hedge that would not obstruct the free movement of the air above, and still hold the snow and prevent sweeping winds blowing along close to the surface of the ground.

Mr. Dyckman.—Nearly or quite all the peach trees lost along our lake shore during the severe winters were because of the lack of *root* protection. I think we need to go very slowly into this matter of screens, there is great danger of over doing the matter. My choice now would be a thin grove of tall growing trees like Lombardy poplars and some means of protecting the roots. I have thought that a mulch of saw-dust might be the best thing that could be employed.

Mr. Chapman.—My experience has all been such as to lead me toward *free* protection, that is open country, with free circulation of air, with due regard to elevation, and I live in the interior of the State.

Mr. Anderson.—I am surprised to hear any one talking of such protection as

trees will give when we are supposed to have so good a mother as Lake Michigan to keep us warm.

Mr. Stearns.—I wish to add one word about the kind of trees to employ in screens. It is quite important that when our trees are planted out for this purpose they live. The pines have large roots with few fibres while the opposite is true of spruces, and it is less hazardous in any season to plant out spruces than any of the pines, and as long as all agree that the spruce is good for the purpose, this is another argument in favor of its use.

The next question for consideration was:

OF THE NEWER STRAWBERRIES WHICH ARE THE MOST PROMISING?

Mr. Lyon opened with a paper as follows:

The accompanying notes upon a collection of strawberries now fruiting upon our grounds are made during a pressure of business so exacting as to preclude a very careful examination and comparison of authorities, and hence it is possible that cases of mistaken identity may have remained undetected: although in nearly all cases it is believed that no doubts can exist as to their correctness to name. They are in nearly all cases growing upon light sand, but generally extending into that of a stronger character.

Nicanor was the first to ripen, showing a few ripe berries on Tuesday, the fifth of June. This must be considered as strictly an amateur berry, rather small in size, borne on short stems, and should always be mulched to keep the berries clean. Fruit of high quality, small in size, but glossy and rich in color—very productive—plant not very vigorous.

Matilda is a strong vigorous grower, ripening a few berries within a day or two after the preceding, but seems likely to continue in season somewhat longer—a circumstance possibly attributable to a somewhat stronger and moister soil. It is producing a very heavy crop of exceedingly large and showy berries of very good quality, and seems quite promising as a good market berry, at least for near markets. It may prove deficient in firmness as compared with the Wilson, which it equals—possibly exceeds—in size and productiveness.

Mexican Everbearing may have possibly shown an occasional ripe berry earlier than either of the foregoing, and the slender feeble, looking plants may doubtless be depended upon to continue the process till stopped by the autumnal frosts. Any one fanciful in such matters, by planting a rod or two square of this, may be able, at almost any time from now till October, to indulge in a dish of strawberries. Its appearance and quality are too well known to require description.

America is a comparatively new variety introduced, or at least disseminated, through this region by parties at Kalamazoo. It showed ripe fruit this year as early as the 6th of June. The plant is vigorous and very productive both this year and last. Fruit large, quality excellent, but lacking in color, and to some extent in firmness, unfitting it for any but near markets.

Downer's Prolific may be set down as ripening its first fruits this season on the 6th or 7th of June. The plant is vigorous and very productive, and the fruit large and beautiful but rather tart. With a little more firmness it would take a high position as a market berry.

Chas. Downing this year ripened with the preceding and with more color and

firmness would be sure to assume a very high position for general market purposes, as it possesses some important advantages over the Wilson, among which are improved quality and a tendency to hold its size well late in the season.

Green Prolific may be set down as commencing to ripen about the 6th to 8th of June, and when impregnation is properly provided for is pretty sure for a good crop, from which a near market will ensure satisfactory results.

Early Hudson showed a few ripe fruits about the 9th or 10th. The plant is vigorous and very productive and the fruit very large and showy, but rather lacking in firmness for marketing. Its vigor, productiveness, large size and fine color would seem to render it worthy of consideration as a market fruit.

Col. Cheney. Our plants of this came from Purdy—its chief disseminator—and hence should be correct. Last season, however, the fruit appeared so much like Jucunda that some of our growers questioned its identity. The examinations of this year, however, have satisfied us of its correctness. It began to show ripe fruit about the 10th or 11th—a cool, moist spell having intervened and retarded its ripening. We regard it as a very promising variety.

Boyden's No. 30 (Seth Boyden) may be set down as showing ripe fruit about the 12th. The plant is very vigorous and the fruit very large and showy, with strong stems carrying the fruit well up from the ground. It is to be regretted that its productiveness is uncertain. It is doubtless most reliable under the system of hill culture.

Dr. Warder ripened a few fruits about the 13th. It seems to be moderately productive and large, but does not, so far, display any specially promising qualities. In flavor it is rather acid.

Golden Queen also matured a few fruits on or about the 13th. The plant is vigorous and moderately productive, the stems tall and the fruit of rich color and excellent flavor, as well as of large size.

Monarch of the West ripens with the preceding. The plant is vigorous and very productive, and the fruit very large, of good color and fine quality, although deficient in firmness of texture. Notwithstanding this, it possesses so many valuable qualities that we cannot but expect it to achieve a high position as a market variety.

Hooker may be set down as ripening its first fruits about the 14th. The plant is strong and healthy, but a light bearer. The fruit is below medium size and of very high quality. In fact, too poor a bearer to be esteemed among so many larger and more productive ones.

Lackhurst comes in at this time. The plant shows medium vigor and productiveness, and the fruit large and of high quality.

Champion is a plant of medium vigor and productiveness. Fruit large, rather acid, and lacks firmness.

Romeyn's Seedling, growing on light sand, is not a strong plant, but productive with rather short stems. The fruit is very large and the quality mild and very pleasant. We regard it as worthy of extensive trial.

Cowing's Seedling, ripening with the above, was obtained among others for trial, with little faith in its success, but its performance this season is such as to beget high hopes of its future value. The plant is a strong grower and productive, bearing the very large fruit on stems of medium height. It is tolerably firm in texture, and of better than average flavor.

Kissany ripened a few berries on the 15th. The plant is of medium vigor and may prove productive; the stems tall, carrying the large, often cockscomb shaped fruit well above the ground. It is rather acid and of only medium firmness.

Scarlet Globe,—ripening with the foregoing,—is a plant of medium vigor and only moderately productive, carrying its fruit well up on long stems. Fruit large and acid.

Ida seems to possess the quality of producing an unusual quantity of wood, and sets a large amount of fruit which is carried well up from the ground, but the specimens are small and rather acid. I found the first ripe fruit of this on June 6th. It can hardly be considered valuable, at least for this locality.

Michigan showed a few ripe berries on the 16th. There are few more vigorous and healthy plants than this, and it shows a high degree of productiveness, the quality of fruit set being very large. The fruits are of fair size, about as large as Wilson, and the quality medium. With greater firmness of berry and higher color it might aspire to become a leading market fruit. The stems are tall, holding the fruit well up from the ground.

Golden Perpetual is a strong growing variety with small and few berries, which possesses the very unusual peculiarity—indeed, so far as I know, confined to this variety so far as its class is concerned,—of producing fruit in succession, through the season, the runners frequently before rooting pushing up and maturing a cluster of fruit, and continuing this process till arrested by the frosts of autumn. So far it appears to be a thin bearer, and to be chiefly valuable as a curiosity or as the possible parent of something more desirable in this particular direction.

Seneca Chief commenced to show ripe berries on the 18th. The plant is a very strong grower, and bears its fruit on stout stems of more than medium height. The fruit is large, firm, very rich, and of high flavor. It was, last year, brought into the Kalamazoo and South Haven markets of exceedingly large size, and it is claimed to be very productive, a claim that seems quite likely to be sustained here.

President Wilder, somewhat unexpectedly, is not yet (18th) fully ripe, it requiring two or three days yet to mature its first fruits. My experience with it hitherto seems to indicate that it does best on strong soils, and the fact that I have not planted it on such may at least in part account for the tardiness of its ripening.

A large number of the still newer sorts have only been planted the past spring, and nothing reliable can be said respecting them from our own experience or observation.

Wilson, Jucunda, and Triomphe de Gande, have only been planted on our grounds the present season, and hence are not in condition to be compared with those noted. We learn, however, that the Wilson made its appearance in our local market, of home growth, about the 7th or 8th of June.

Prof. Beal.—I have been watching with a good deal of interest several of the newer sorts, and the Matilda pleases me exceedingly. The Seneca Chief is a very good colored berry, ripens evenly, and of excellent quality; the Monarch of the West is very large and productive, but seems to be quite uneven in its ripening, that is the tip of the berry will be green a long time after the base is fit to eat. I am satisfied with the success we have attained in the size of berries, and think we need to look more to the form and color; we wish a high colored berry of medium size and comely form to sell well. It is well worth the while for those bringing out new sorts to bear this in mind. For my own part I am not attracted by irregular berries, no matter how large they may be.

Mr. Thompson.—I wish to say a few words from the standpoint of a con-

summer. I have been eating sour strawberries from the beginning of the season. They were all tempting enough to look upon but I have not eaten a real luscious sweet berry this year, and doubt if there has been one in the city of Detroit. The venders come along the street crying their "Fresh ripe strawberries ten cents a quart," but the little girl who came out of the gate crying in derision "Fearful sour strawberries ten cents a quart" echoed my sentiments exactly. I wish our strawberry men would pay more attention to the quality of their berries, and I am not particular how large they are. My physician seemed to connive with the berry venders this year. He recommended an *acid* diet and the berry men furnished the material. It is said that the Wilson strawberry is the one principally on market. If those I have eaten are Wilsons I am a Wilson man no longer. Let us have something good to eat as well as good to ship.

Mr. Lyon.—I would say to Mr. Thompson that the trouble with the Wilson does not lie in the intrinsic merit of the berry, but in the fact that growers ship it when too green for eating. When thoroughly ripe it is excellent in quality.

Mr. Winchester.—For our soil we like the Monarch of the West very much. We are upon a sandy foundation and it seems adapted to our conditions.

Mr. P. C. Davis.—There is a great difference in the Monarch on clay and sand. I have had them this season of beautiful, regular form on sandy soil, quite irregular on loam, and exceedingly contorted and ill shaped upon clay.

Wednesday Afternoon.

The following essay was then read from the pen of one of the oldest members of the society, Mr. S. B. Peck, of Muskegon, on

THE AGE IN WHICH WE LIVE.

Great changes have taken place within the century just past in almost everything that relates to human life. By reference to history and our own experiences we shall see that these changes have been more marked within the last half of the period. These great changes have by common consent taken the names of improvements, and if the accumulation of property be the main business of life, they are correctly named. But the real value of life is in its enjoyment, and whatever of these changes have added to our happiness or relieved us from any of life's evils, they are truly blessings. The question has been raised whether we are capable of continued happiness, and whether each one, whatever be his surroundings or the circumstances which affect him, does not through life enjoy an equal average share of good and evil. Be this as it may, the fact is patent, and will not be questioned, that good and evil are mainly only relative qualities, and that what in life's occurrences are evil or good to one may be the reverse to another. It is not wise, however, to come to the conclusion that life's enjoyments and blessings are not promoted by our own exertions to produce them. We must admit that certain eras in our lives have been more satisfactory to ourselves than others have been. Our efforts should, therefore, be to make the most of life, to weary the physical man less, and to satisfy the mental man more.

The question which I would here raise is whether the great changes which we call improvements have added to our average of happiness, or more specially whether we have received the most good from them that they were capable of

bestowing, or whether at the same time that we have received benefits from the great inventions and improvements of the age, we have not allowed counterbalancing evils to creep in. The man of "three score years and ten" and the octogenarian can testify to the sum of human enjoyments before the advent of many of the great improvements that are credited as blessings to the human race. During their lives the reaper and mower have taken the places of the old sickle, grain cradle, and sythe; and the horses, guided by a single man's intelligence, perform in a day the labor of several men. The threshing machine has taken the place of the old flail, and the neighbors with their teams join hands and perform in a day what was before a winter's job. Along with the flail is laid up in a loft devoted to rubbish, the old corn fan, the flax break and hatchel, as of no further use. The old clumsy two-tined iron hay fork with its prongs often akimbo with its congener of three times, in the shape of Neptune's trident, but used for a less fabulous purpose, are replaced by lighter and better tools of the same name.

The sower who used "to go forth to sow" on foot, and scattered his seeds by hand, now rides in a chariot which, though less classic, is fully as honorable as the one in which Pharaoh was drowned; and he dispenses his seeds by machinery, and needs to scatter none by the wayside. The moon that used to interfere with the times of sowing and planting, and meddle with the weather, now devotes her exclusive attention to bestowing light and regulating the tides, and otherwise demeans herself as a respectable moon should. The signs that used to dictate to us when to doctor our animals, now allow us to study our own convenience in the matter. The old theorem that we should reap what we had sown, now turns out to be true, though for a century we reaped chaff where we had sown wheat. The ghosts and spooks that used to haunt houses and scare people by moonlight, are now gone with the Salem witches. The razor that used to require at least a weekly use in mutilating the face of man is now used mainly in paring his corns, or is made into a pruning knife. The Lucifer match has taken the place of the old flint, steel and tinder, a saving of time, expense and temper. The seventh son that used to be born a doctor, *volens volens*, now does as he pleases about it, and the patient has more faith in a diploma than in parentage. The railroads now carry us 500 miles in the time that it took us to go 100 by the fastest stages and at less than half the cost. Instead of weeks and months that it took to communicate with absent friends, we now, through the telegraph, accomplish it in less hours. Where we used to pay six to twenty-five cents postage we pay one to three. The sloop that carried the runaway boy Ben Franklin from Boston to New York in the short space of three days, is now replaced by the steamboat that carries less worthy men over the same space in a few hours.

It is said that the rude dug out sap-trough that officiated as a vessel for maple sugar-making in primal times, was between seasons used as a baby cradle; now the baby's cradle is made of fancy wood, and he has a hand coach with a top, and steel springs. Young America used to learn his A B C, sitting on a slab bench without back, now he sits on a divan in a temple, and is fast getting to be the most important person of the age. During this time we have learned to economize the muscular forces of ourselves and our beasts of burden, so as to double the effects produced by them; the loads drawn by our logging teams would once have been laid to magic; the simple improvements in the log chain and cant hook, costing nothing but a little wholesome thought, are worth thousands yearly to our lumbermen.

The spirit of improvement has at the same time entered the household and taken her seat, not on the time-honored domestic hearth by the cheerful fire, but on the carpet by the coal stove or register. The good wife who used to broil her meat and her face at the same time over the open fire, can now keep comparatively cool over the stove, and then do the honors of her table with a placid countenance. The weekly washing, the dread of the women and the terror of the men, is now by machinery made relatively pastime, and the wringing no longer dislocates the fingers, but is done with wheels and cogs. The sewing, the darning, and the knitting needles have lost their high stations and nearly outlived their usefulness. The old wooden trencher and the gourd ladle are only seen at centennial exhibitions. The spinning wheels, big and little, with the reel and hand loom, are now out of date.

Other changes affecting the interests of the race, if not their welfare, have in the same time been going on. The improvements in domestic animals, the introduction of the Shorthorns, Devons, and Jerseys, the Morgans, Percherons, and Clydesdales, the Berkshires, Chesters, and Essex, the Merinos, Cotswolds, and Southdowns, the Bramahs, Dominiques, and Cochins, have given in the horse more strength and speed; in the bovines more beef, butter, and cheese; in the sheep more mutton and wool; in the swine more pork for the feed, and in the poultry more flesh and eggs.

And now, when we contrast the present with the past, we raise the question *cui bono*? Are we better off? Are we more happy? We are surely more wise, we live longer, more easily raise the food we eat; we are more intellectual, we enjoy pleasure with a keener zest, and we understand much that was once mysterious; but all this does not show that we make the most of our opportunities. Are we really more happy than our forefathers of a hundred years ago? Do you men of three score see in the present generation of young folks more contentment than you enjoyed fifty years ago? and if you do not, please answer the question if you can, why is this so?

I charge you and myself with the fault. We are extravagant, we lay out too much in fine carriages, we build too expensive houses, buy too costly furniture; we indulge in too much style, we do not know enough, we must know more, we have *got* to know more; the world moves and we have got to move with it or be left behind; we must furnish our houses with less upholstery and more books, less china-ware and more newspapers. We must know more of geology to teach us how to manage peculiar soils, more of climatology to teach us what aspects are best for certain plants and fruits, more of entomology or we shall be ruined by insects, and all we can ever know of botany, physiology, and hygiene, will surely come into play, and cannot fail to add to our enjoyments. Chemistry has been awfully neglected in our education, not so much that which relates to metals as that of animals and vegetables; to know what elements we eat and what we eat them for, what the plant and fruit is made of, and where it gets it. Do you ask how is the farmer or the fruit grower to learn all this? Why, just as he learns everything else. Do you say he has no time for study? He has more time than any other mortal man. Do you ask who is to teach him? He has in himself, the best and most faithful teacher in the world; he has learned to read, let him read.

I verily believe that we might enjoy life better than we do if we only lived right. I don't believe in miserly habits; a man should indulge his own and his family's taste for superfluities as far as he can afford it, with prudence and forethought, but he should not indulge in luxuries because his neighbor does,

but have selfishness enough to prefer home comforts, to showy acts to excite the envy of others. Neither do I believe in laziness. Our well educated and developed muscular forces are worth a fortune to us, but we lose them if not employed, or if we abuse them by overwork. Remember that you have, or ought to have a family, and that they are your best companions and most trustworthy friends, and should have a voice in all matters that affect them, merely allowing yourself the veto power on stating rational objections.

I have thus far spoken of ourselves as individuals. As communities we have also been extravagant, and ever since the war began we have taxed ourselves most outrageously to support this extravagance. We have built too costly capitals, court houses, churches and school houses, that have not only taxed us heavily but thrown us into debt, that has encumbered our property and paralyzed our energies. It is estimated that the gross indebtedness of the Northern States has increased from one hundred to three or four hundred per cent within a few years. Here is a young city in the eastern part of this State whose indebtedness is forty-three per cent on its valuation, and every man, woman, and child within its corporate limits (taking the census of 1874 for its population) is mortgaged to the amount of over fifty-one dollars each. This matter of indebtedness and taxation is one that interests us all, and should engage a share of the attention of every man. I charge not our officials generally with dishonesty, but why is it that our taxes have thus increased? We have increased the area of our tillable lands, we have increased our productions and our property in kind, and though we have not increased the number of our township officers or their salaries, except slightly in the case of the supervisor, still our taxes have gone *up, up*.

I have in the Patent Office Report for 1851, just read a letter from B. A. Coop, a farmer in the old, worn-out, rockbound State of Connecticut, in which he speaks of the general prosperity of farmers there, and says that a young man with a capital of two thousand dollars easily increases it to from \$10,000 to \$15,000 in fifteen years. The secret follows: "Our taxes are less than twenty-five cents on a hundred dollars, including school taxes, and we have good schools, too, ten months in the year."

The difference between one-quarter of one per cent as in this case, and five per cent, which, perhaps, is the average of our cities and towns (it certainly is not the maximum) if put on annual interest at ten per cent, will on this \$2,000 amount in fifteen years to \$2,736.75. Need we go any further than this one item of taxation, to explain the reason why the times are so hard, and why every one is growing poor?

The business of recuperation once begun in earnest, will in time correct the errors we have fallen into. Adversity is a good lesson if we heed its teachings, and often leads to the most permanent prosperity. It is said that the French nation after exhausting itself in the late war with Prussia, including the vast sum paid to the victors as the price of peace, is to-day better off than Prussia with all her spoils, and it is even predicted that the Southern States after being drained of their very vitals by the late war, will recover their normal condition before their Northern conquerors. The city of Chicago after being visited by the most destructive fire of modern times, has by taking a firm hold of the situation, so far recovered her former prosperity, as to have to-day a less indebtedness in proportion to her valuation, than most of the cities of our State. Her citizens have taken the bull by the horns, have inaugurated municipal reform clubs, which claim to have reduced taxation one-half within the past

year. Municipal and national reforms never come, except through the united efforts of individuals. England's Magna Charta was not obtained for the mere asking.

It is hopeful and cheering that many of our best statesmen are awake to the fact that the people cannot stand the present rate of taxation in times like these, and are well aware that states, cities, and individuals must retrench collectively and individually. The late Governor of this State in his farewell address, the Governor of Wisconsin, and most especially Governor Robinson of the State of New York, are awake to the subject, and give us wholesome advice, and stump-speech-making candidates for office are aware that they must preach reform in order to succeed.

Perhaps I owe an apology for so long occupying the time of this assembly with topics not strictly pomological, but I was allowed by our Secretary to choose my own subject, and I had little hopes of entertaining such an assemblage as would be likely to be here on this occasion, with matters pertaining to pomology alone. The extracting and cremating fruit trees by the thousand that I had planted myself, has diminished what little confidence I had in my ability to advise others on the subject of pomology.

Prof. W. J. Beal, of Lansing, then took the floor and addressed the audience upon the topic,

LONGEVITY OF VARIETIES AND RACES.

To begin with, let us consider the question, what is a variety and what is a race?

The seeds from one plant may not all produce plants quite alike, especially if they are sown in different places and treated differently as to light, heat, moisture, richness and texture of the soil. The seeds of these plants after a year or more of such diverse treatment, will, or may produce individuals so distinct from each other that some or all of them may be called distinct varieties.

All *varieties* of plants, using the term in its accurate signification, can only be propagated by removing some part of a plant and placing it where it may continue to grow. That is, it is grafted, budded, increased by cuttings, runners, layers, offsets, tubers, etc. Examples of these are all our apples, pears, cherries, gooseberries, currants, strawberries, and potatoes. A *variety can never reproduce itself by seeds*, for as soon as it reproduces itself with a considerable degree of certainty, it is no longer a variety, but a *race*. Races are obtained from varieties and hybrids by constantly selecting seed from those having the peculiarities desired, and planting them apart from other varieties. In this way, after a time, varying with the variety, it will come true to seed, as we say, and nearly or exactly reproduce itself.

In this way we have obtained most of our races of garden vegetables, as all our different kinds of cabbages, lettuce, radishes, turnips, beets, onions (those raised from seeds), squashes, cucumbers, Indian corn, oats, and wheat. Some peaches will nearly always come true to seed. They are ceasing to be varieties. They are becoming races. We are getting new races every year. No doubt, with time and care enough, any variety may become a race, even any of our apples, pears, pelargoniums, verbenas and potatoes.

Among animals we have examples of races in the different kinds of cattle, as Shorthorns, Devons, Herefords, and Galloways. The Berkshires constitute a race of swine, the Southdowns a race of sheep, the Light Brahmas a race of fowls.

In speaking of the longevity of varieties we must make a distinction between these and what are termed races. There may be some reasons why a variety may degenerate while a race may not degenerate.

In the case of most animals, new individuals are produced by fertilized eggs. Some of the lower forms are also reproduced or multiplied by buds or off-shoots which become independent individuals. These lower animals, which often bud and branch like plants, are also occasionally, at least, reproduced by fertilized eggs.

Our plants are multiplied in two ways: by budding, branching, etc., and by seeds or spores. Some of our lowest water plants consist of a single microscopic cell. This cell has a way of rapidly increasing in numbers by repeated division. We may see no reason why this process might not go on forever without degeneracy, but all plants some time or other under their normal condition produce seeds or spores—fruit in some form or other. Even in case of these minute one-celled plants of which I spoke, once a year perhaps, two of them approach each other and meet. The cell walls break away or disappear in certain places; the contents of one cell is all poured into and mingles with the contents of the other. This mingled material formed two new walls about itself and escapes from the old shell and floats away to begin a new growth the same as before. In some cases two rows of cells meet in this way. The contents of two cells are used to make a single new one. In other cases, three cells are united to form one new one.

This blending of cells is a process answering to fertilization. It cannot, of course, go on continually without other ways of propagation, as there is a loss of 50 to 66 $\frac{2}{3}$ per cent for every such spore which is produced. Why should the higher plants resort to the mode of reproduction by seeds if this mode is not necessary in some way to the well being of the plant? Why should these lower plants blend two or three into one to fertilize and begin anew if the process is not of some advantage to the species?

Do varieties wear out?

Thomas Andrew Knight, the famous English horticulturist, believed they did wear out, and gave what he supposed were good examples, among which was the Golden Pippin apple. He also believed that any variety of apples or pears would last no longer than the parent tree.

Mr. William Masters also believed that varieties wore out. We know now that varieties may last longer than the parent plant.

The Golden Pippin apple is still grown in perfection, a long time after the death of Mr. Knight.

A plant may be injured by bad cultivation. It may become diseased and die. Cuttings, buds, or even seeds from such diseased or enfeebled plants may make diseased or feeble plants.

By some means, certain varieties of potatoes which have been kept for six or eight years on the College garden have failed to set any tubers, many other sorts have produced only a few small tubers. A set of such potatoes was sent to Kansas Agricultural College and given good treatment for one year. Of those varieties which had dwindled down to very small specimens at Lansing, none revived or did better in Kansas. They all continued to degenerate. The cause of this degenerating I am unable to give, the fact cannot be doubted. Some will attribute it to bad management, others to a weakening of the variety. Some varieties of potatoes at our farm have yet shown little or no signs of degeneracy.

It is true in most places that seedling verbenas are healthier and more vigorous than plants which come from cuttings. This may be due to the unfavorable conditions to which the cuttings are subjected, or to bad treatment of the stock plants in winter. Most of our best verbenas have not been raised many years from cuttings. New ones are constantly taking their places. So with potatoes, new varieties are mostly taking the place of the old.

There is no denying the fact, that there are still some very old varieties of plants in a healthy condition. Some varieties of grapes are said to have been propagated for 2,000 years.

Lindly, Downing, and De Candolle admitted the facts which Knight and others brought forth, but rejected the reasoning and the inferences drawn. As they believed, "It was disease, not degeneracy, and this disease propagated by grafting, which caused varieties or individual plants to disappear."

The late William Patterson of Scotland, in a premium essay in 1870, observed that varieties of potatoes very rapidly degenerate and ultimately become worthless, "attributed to repeated planting from the same stock, without an infusion of new blood."

President Wilder, in transactions of American Pomological Society, p. 19, 1869, writes, "However we may theorize in regard to this matter, it must be admitted, from the practical point of view, that some fruits have so declined as to render it absolutely necessary to replace them with new varieties." He cites pears in our day as examples: St. Germain, Crassone, White Doyenne, etc., once so excellent. Where are they now? For the great majority of locations they will continue to be worthless.

President Wilder also cites the Catawba and Isabella grapes as other examples of fruit which is declining. Some varieties hold out better than others, as the Red Astrachan apple, Bartlett pear and Wilson strawberry, which seem to thrive almost everywhere. Others thrive in only limited localities.

Dr. A. Gray believes that "varieties, though not liable to change, may theoretically be expected to wear out, but to be a very long time about it; that sexually propagated varieties or *races*, although liable to disappear through change, need not be expected to wear out, and there is no proof that they do."

The longer a race is bred or reproduced from a succession of similar individuals, the more permanently fixed it becomes. The progeny are more certain to be like the parents. This is well shown in our thoroughbred cattle, sheep, horses, swine, and poultry. Probably if closely related parents are to be bred together it is better that they should have been kept for some time in countries remote from each other, subjected to different surroundings as to food, air, temperature, etc.

In the case of plants this has been proven true by recent experiments of Darwin. Instead of trying to infuse new vigor into a race by introducing or crossing with another race, bring together those of the same race which have been long raised in different localities. The result in most cases has been a wonderful increase in the size and hardiness of the plants, the size and yield of the seeds or fruit. This result has been worked out by Darwin, and has been proved by many experiments tried on a great variety of plants. The idea is a very valuable one to the raiser of fruits, flowers, grains, or vegetables.

The committee on fruits, finding it necessary to leave on the afternoon train, were allowed to present their report, as follows:

MR. PRESIDENT:—Your committee, to whom was referred the fruit exhibited here, would make the following report:

We find thirty-five varieties of strawberries on exhibition, among them are the following, each plate undoubtedly containing the best samples of its kind: Seth Boyden, Seneca Chief, Col. Cheney, Monarch of the West, Jucunda, Triomphe de Gand, Kentucky, Cowing's Seedling, Green Prolific, Wilson, Luckhurst, Charles Downing, and a new berry claimed to have been originated by H. E. Bidwell, of South Haven, named "Centennial." The last named in size, quality, and appearance is equal to the best on exhibition.

Your committee were agreed upon recommending the five best berries in the order named, recognizing the fact that a report to be valuable must embody the result of the investigations in a specific mention of named varieties.

The result is as follows: Monarch of the West, Seth Boyden, Seneca Chief, Col. Cheney, and Triomphe de Gand.

The entries of cherries are limited to five different varieties, namely, Elton, Black Tartarian, Early Richmond, Baumann's May, and Gov. Wood. The entries named are mostly in an immature state, and an intelligent opinion could not be arrived at from the investigation of quality.

A splendid basket of Golden Russet apples, exhibited by D. C. Loveday, were in a perfect state of preservation, and worthy of special mention.

C. ENGLE,
A. C. GLIDDEN,
C. N. MERRIMAN,
Committee

Mr. J. P. Thompson then occupied a few moments with a talk upon

GREEN MANURING.

I hope that they will give the cultivation of orchards a thorough stirring up at this South Haven meeting. This practice is more common than it was. The hide-bound orchard is a more rare sight than it was. It is a common thing to see the plow in the orchard, and this year especially a great many orchards have been plowed. In this connection it is proper that mention should be made of the fact that restitution to the orchard soil is a more common practice. In the Farmer last week mention was made of Mr. Bailey's apple orchard. He is a man who feeds his orchard. He gives restitution where it is deserved.

It was at one of the meetings of the Pomological Society that the necessity of a system of fertilization of orchards for this State was broached, especially of the orchards of the Michigan Lake Shore, where the soil is of a silicious character. From this teaching has come the practice of plowing in of green crops which cannot be too highly commended for orchards as well as for general farm lands. We are indebted to the well known agricultural chemist of our State, Prof. Kedzie, of whom we may well be proud, for a most emphatic endorsement of this mode of enriching the soil. When we contemplate this rich heritage of a State, so well adapted to the fruits, cereals, grasses and vegetables of a temperate climate, we cannot but feel a little anxious when we think this soil is liable to exhaustion. These broad acres are liable to go back to waste and barrenness. So that the question constantly arises—How can we pay back that which is taken? How can we restore these crops that are gathered, marketed and sold? The great effort is to take from the soil. All the powers of air and water and earth are harnessed to carry from the bosom of

our common mother those products which feed and clothe the millions. We must pay back every cent we borrow as we do, from the air or from the earth; we must do our share toward replenishing these great reservoirs of plant food. How are we to do it? How can this great debt that is being constantly increased be paid, principal and interest?

For fertilizers we are pointed to the new improved and valuable commercial superphosphates and compounds now in the market. We are pointed to the millions of domestic animals, to the herds of cattle, sheep and swine, upon which we so justly rely to sustain and restore the powers of an exhausted soil. But if we were dependent alone upon these great and valuable agencies we should fail in our system. Gradually we should dwindle; our products would dry up and we should become a non-exporting State, for the reason that in order to stand in competition we must have cheap fertilization. This is necessary for the wheat farmer as well as for the fruit culturist. Hence we point out again and again the advantages of feeding the soil with its own green crops. The practice is not uncommon and is growing more and more in favor. It is likely that the plowing under of green crops is essential to the orchard system of the so-called Michigan fruit belt as well as to the interior orchards of the State. The problem is more productive power. Without it the agriculture of the State, and its horticulture and pomology will go backward.

This question of soil power is the great one of the hour. We may study varieties, methods, experiments, times and seasons, foes and friends, until the crack of doomsday, it will be all in vain, if we have not power in the soil to sustain plant growth. Here in the early career of the State it is a fearful and solemn question to ask—Are we on the turning point of our productive power? Are we on the downward road? Is the fountain exhausted? We may talk of our social, intellectual, and moral improvement, but it will be in vain if the soil under our feet is degenerating. The people who decline in the productive power of their orchards and farms are on the highway to ruin and bankruptcy. Hence this question is constantly staring us in the face. We cannot cry it down. We should say, feed when you crop—give as well as take. Seeing the necessity of a cheap, easy, ready fertilizing agent—one immediately at hand, one directly in line of the business—we point to this system of green manuring. This in connection with all other agents, with rotation of crops, with stable and barnyard manures, with plaster, ashes, and marl. Green manuring consists in plowing under clover, buckwheat, rye, or other crops when in blossom. The first crop is sacrificed, so to speak, for the sake of the succeeding ones. As these plants, or some of them, will grow on poor soils, it is possible by their help to reclaim the lightest sands and bring them up to a fair degree of productiveness in the course of a few years. This system of fertilization is applicable to farm and orchard, to a general system of mixed horticulture and agriculture. It appears to be well approved and accepted in this State.

Following this paper the ensuing discussion took place, covering several topics:

Prof. Beal.—The more I see of our orchards through the State the more decided I am in the opinion that what they want first, is thorough underdraining, and second, feeding. I do not mean that all orchards are not set in land that requires under-draining, but a majority of them go with wet feet, and consequently stunted growth. I am not particular as to the method of feeding,

whether it be by green manures, or the addition of barnyard compost, or lime and ashes, only keep feeding constantly.

Mr. Strong.—Will some one tell me about rust on berry bushes, and what is good for it.

Prof. Beal.—The rust which we see on our blackberry bushes is a fungoid growth. I have seen it on the wild bushes as well as the cultivated ones. It gives the plants a yellow appearance and stunts the growth. The only effectual remedy that I know is the one you give to that other kind of yellows in the peach,—dig out the bushes infested and burn them up root and branch.

Mr. Wigglesworth.—I agree with Mr. Beal in this matter exactly. The rust with me is more common on the Kittatinny than on the Lawton. I believe the way to deal with it is to remove and burn as soon as it appears in a patch. It seems worst on wet soil. I suppose that if left any length of time it propagates in some manner rapidly.

Prof. Beal.—Yes, a little later the little spores which answer to seeds—so minute as to be invisible to the naked eye—will fly in every direction, and those that fall on the right place for them to develop will grow, producing other plants in vast numbers. I say plants, for this rust is among the lowest forms of plant life.

A paper was read from the pen of Dr. Owen, Secretary of the Adrian Horticultural Society, giving a thorough description of the appearance of the Bailey orchard, near Adrian, which has become notorious from the work of the canker worm in it, which we give in full.

THE CANKER WORM IN LENAWEЕ COUNTY.

Yesterday, in company with Artemus Sigler, I visited what is known in this section as the Bailey orchard, which has attracted considerable attention the past two years, and especially the past month, from the devastation of what we call the canker worm, and that the injury is so complete and so alarmingly on the increase. I inclosed some worms in a box and sent you on Saturday, the 9th, for your inspection and that of Prof. Cook, thinking possibly it would be of interest to your readers. You will notice there are two kinds of worms, different in size and color, and averaging from half an inch to one inch in length—one of a dark color and the other lighter and the largest of the two. The orchard is located about three miles north of this city and contains three thousand trees; about two thousand were planted twenty years ago, six or seven hundred five years later, and the balance are older. Trees planted when the country was quite new. The soil is quite sandy and the trees planted too close together, being about one hundred to the acre, except the oldest part, which I think are twenty-four feet apart. The trees planted twenty years ago were low heads, and being so close, were together in the tops as soon as fruiting was fairly established, and for the past few years the ground has been densely shaded. I have watched this part of the orchard, as well as those planted since, from the day of the planting, and the growth has been unexceptionably good, and till last year the fruiting has been quite up to the average, but no sunshine could reach the soil. In passing through it yesterday it looked like the valley of death, not a green leaf to be seen, and presents the appearance as though a fire had passed through it. A few trees in the northeast corner, as well as some on the northwest, have as yet escaped the ravages, but probably nine-tenths of the whole have only skeleton leaves—like the branch I sent you on

Saturday. On close inspection in the part of the orchard where the worms first made their appearance, new buds are putting out, and last year, after the worms left, the trees did put out new leaves, but the apples ceased to grow, and either dropped from the trees to the ground or shriveled on the limbs. The appearance of the orchard near sundown, where the worms have full possession, is of an immense web, each worm hanging by his silken thread of various lengths, swaying in the breeze, by countless millions.

Last year only about half the orchard suffered from their depredations, and I notice where they stripped all the leaves off last year the tree shows less vitality this year. But now they are not confined entirely to the Bailey orchard, but have attacked several that are near by in the neighborhood, not to any alarming extent for to-day, "but what of the future?" The first noticeable damage of any extent to attract public attention was last summer, though some few trees have been denuded of their leaves for two or three summers before, but the owner thought nothing of it. Last year, however, about half the orchard was blasted, and now nearly all, and reaching outside to new fields, and the owner or the authorities doing nothing. "Where will it end? What can be done?" I apprehend that, unless some effective measures be devised, and active and energetic general treatment be prosecuted, not only the Bailey orchard, or the orchards of Lenawee county, but the orchards of the State of Michigan and those adjoining will be lost to the productive interests of the country. I am not competent to give any legitimate reason why this particular orchard should be so severely attacked and so completely eaten up, as it were, by this particular enemy, but I will offer a few suggestions for your consideration: The first few years, when the trees were small, root crops, generally potatoes, were planted, the trees grew quite thrifty, and for the past six or seven years it has been one dense thicket of trees, with the lower limbs close to the ground. I have never known any fertilizers applied; apparently the growth was sufficient without it; but nevertheless, with this great draft from the soil, which is quite sandy and naturally poor, and the sun's beneficial rays shut out from the soil, would it not cause an inherent weakness, open to the attack of the first enemy which presented itself, and the past three or four years the orchard has shown less of the vigor and thriftiness which was apparent in its earlier developing. Were the orchard mine, I would cut and grub out every tree, thoroughly cultivate and fertilize the soil, and then call upon the scientists of the State Pomological Society for the best remedy to exterminate the pests. I would then fight them with those remedies with my whole strength, and if I was inadequate I would call on pomological, horticultural, farmers' clubs, and other kindred societies, and if all failed, would submit it to the supervisors of the county for help.

WOODLAND OWEN.

ADRIAN, June 29th.

Mr. Garfield.—The people about Adrian are getting to be quite alarmed over the visitation of the canker worm, and are desirous that our society give them advice as to the best methods of extermination.

Mr. Thompson.—It is about time the Lenawee people were awake to this nuisance: they have held their hands too long already. The methods of destroying them are well known. In the proceedings of this society for 1876 (soon to be published), is an exhaustive article on the subject by Prof. Cook. The use of tar about the bodies of the trees, which is kept fresh, will effectually prevent

the female insect from climbing the tree, for she is wingless. The second method of extermination is suggested by the fact that the larvæ go into the ground to pupate, where they may be turned up to be frozen to death or eaten up by the hogs. One good thorough man, who understands the habits of this insect, like Prof. Beal or Prof. Cook, would go down into Lenawee county and clear out this pest in one year. It wants prompt and decisive action by a united people. No idle folding of the hands will kill the canker worm.

Prof. Beal.—I learned a new fact, to me, while east recently, regarding the canker worm. It is well known that the male has wings, while the female has none. Observation has shown that when the most careful measures have been taken to keep the female from getting up the trees, somehow she gets there and deposits eggs,—that is an occasional one does. The question how she does it has been partially decided by an observation which has found the male actually flying into a tree carrying the female.

Mr. Adams.—I am not in such mortal fear of this canker worm in Michigan as some are, for I have seen it come and go without spreading to any alarming extent. I have several instances in mind in my own county where the insect has denuded orchards for one or more years and then left or died out, with only their remembrance in our minds.

Mr. Fox.—My near neighbor is suffering from their ravages this year, but I have seen no signs of them in my own orchard.

The next discussion was upon the question,

IN AN ORCHARD OF FIFTY CHERRY TREES WHAT VARIETIES SHALL BE PLANTED FOR MARKET?

Mr. Fox, Kalamazoo.—I am, perhaps, prejudiced in the matter of cherries from my success with one variety. I have several sorts, but if I were to plant an orchard for market I should limit it to one variety—the Early Richmond. However, I have a plate of cherries here known as Baumann's May, that yields large crops, and would do very well in market were it not for the fact that they ripen with the strawberry, which will be chosen any time in preference to the cherry.

Mr. Adams, Galesburg.—I must differ with the gentleman in regard to the best variety for market. I have upon my place 21 varieties, and have marketed for a number of years at the rate of 150 bushels of cherries per year, and my trouble has been that with my other sorts on hand I could not market the Early Richmond at all. The light color is against it. I rank the May Duke as number one. It is hardy as an oak, and I have never missed a crop with it since my trees came into bearing. It is larger than the Early Richmond, which, by the way, I rank not one bit above the English Morello. I get more money next out of my Napoleon Bigarreau. The fruit is of large size, very regularly heart-shaped and handsome; skin is pale yellow, richly dotted with very deep red, with a fine dark crimson cheek; ripening about July 1st. The Black Tartarian I rank along with the Napoleon Bigarreau. It is good to eat even before it has reached its perfection of color. The skin is glossy, of a bright, purplish black color, and flesh of the richest flavor. It is undoubtedly the best of the cherries as far as flavor goes. I find a great difficulty with the light varieties on account of rotting. A single day of moist, dark weather at the right time destroys them.

Mr. Lyon.—I scarcely think Mr. Fox would find the Baumann's May worthy of cultivation even if it did come at another time than at the ripening of strawberries, for it is sadly deficient in quality. I can endorse everything said about the Black Tartarian and Napoleon. There is a variety that equals either the May Duke or Early Richmond in quality, coming later in the season. It was originated more than twenty years ago in France, and for some reason was laid on the shelf for a time, but is becoming quite popular again. I refer to Louis Phillippe. It is tart, but rich, juicy and sprightly, and occupies an important place as following the other varieties. I think even Mr. Adams will accord to the Early Richmond an excellent flavor.

Following this discussion there was an informal talk upon insects, in which a number took part. The following are the most important points made:

Mr. Lyon.—In taking up the canker worm we neglected the last part of the topic announced in connection with it, to-wit: The currant worm. Many people have a great deal of difficulty in maintaining ascendancy over this pest from not understanding its habits. There are two broods of them in a season, and when the eggs are first laid the deposit is made on the lower leaves of the bushes; as soon as the worms break the eggs they take to the leaf upon which they are hatched, and these leaves can be easily distinguished next to the ground. Now if the hellebore be used there is no difficulty in destroying the whole brood at the outset, when, if allowed to remain in power ever so short a time they gain ground with alarming rapidity.

Some one suggested that the rose chafer was getting quite numerous about South Haven, and liable to do a great deal of damage.

Mr. Dyckman.—The beetles came into my vineyard three years ago. When I first observed them they were eating young grapes. I have followed picking them the same as I do curculios, getting boys at it with bottles and paying them by the hundred. I am aware that apple crops have been entirely destroyed by their ravages, and in some places they are taking the peaches; but my own observation leads me to the opinion that peaches constitute second-class food for them. Grapes they enjoy right well, and make a first-class trap for them, where they can be more easily taken than on trees.

Prof. Beal.—I understand that Paris green is being employed to some extent in this vicinity to kill the rose beetles. Is this a fact?

Mr. Bailey.—Yes, sir. I am using it quite successfully in my own orchard, and find no difficulty in controlling the rose beetle with it most effectually. I use it in water, same as for potatoes, and with a syringe sprinkle over the foliage.

Several spoke of there being an element of danger in using a poison on the young fruit, when some of it might become entangled permanently in the calyx and accomplish that which was not intended.

Mr. Bailey anticipated no danger; the apples were so small the rains would take it all off.

Some one in the audience related a chapter of experiences on the use of gas lime for a fertilizer, and as an indirect and unlooked for preventative of the ravages of the codling moth.

Mr. Lyon, in speaking of such remedies, said insects bend themselves to circumstances and will accustom themselves to very bad smells if there is no place free from the noxious odor, and related an instance where gas tar was allowed to smoke under a number of plum trees, having the desirable effect to drive away

the cureulio; but in instances where all the trees of a vicinity were served in this way no difference was noticeable in the crop of cureulio.

Mr. Bryant related a similar incident from his own experience in the use of smoke from gas tar to prevent the ravages of this insect.

The next paper was upon

THE ROSE CHAFER.

BY J. S. OWEN, OF SAUGATUCK.

In selecting a subject on which to write at this time, I have chosen one which in our neighborhood is assuming almost alarming proportions, viz.: The rose bug, or, scientifically, the rose chafer. In searching history for his antecedents, we find in the work entitled "Harris on Insects Injurious to Vegetation," published in Boston as long ago as 1841, that they were then well known, and, after giving its unpronounceable scientific name, describes it as follows:

"It is a diurnal insect, it measures seven-twentieths of an inch in length, its body is slender, tapers before and behind, and is entirely covered with very short and close ashen-yellow down, the thorax is long and narrow, angularly widening in the middle of each side, the legs are slender and of a pale red color, and feet tipped with black and very long."

The natural history of the rose chafer, one of the greatest scourges with which our gardens and nurseries have been afflicted was for a long time involved in mystery, but is at last fully cleared up.

The prevalence of this insect on the rose, and its annual appearance coinciding with the blossoming of that flower, has gained for it the popular name by which it is here known. For some time after they were first noticed, rose bugs appeared to be confined to their favorite, the blossoms of the rose; but within 40 years they have prodigiously increased in numbers, have attacked at random various kinds of plants in swarms, and have become notorious for their extensive and deplorable ravages. The grape vine in particular, the cherry, plum, and apple trees have annually suffered by their depredations; many other fruit trees and shrubs, garden vegetables and corn, and even the trees of the forest and the grass of the fields have been laid under contribution by these indiscriminate feeders, by whom leaves, flowers, and fruits are alike consumed. The unexpected arrival of these insects in swarms at the first of their coming and their sudden disappearance at the close of their career, are remarkable facts in their history.

They come forth from the ground during the second week in June, or about the time of blossoming of the damask rose, and remain thirty to forty days.

At the end of this period the males become exhausted, fall to the ground and perish, while the females enter the earth, lay their egg, return to the surface, and, after lingering a few days, die also.

The eggs laid by each female are about thirty in number, and are deposited from one to four inches beneath the surface of the soil; they are nearly globular, whitish and about one-thirtieth of an inch in diameter, and are hatched twenty days after they are laid. The young larvæ begin to feed on such tender roots as are within their reach. Like other grubs of that tribe, when not eating they lie upon the side, with the body curved, so that the head and tail are nearly in contact; they move with difficulty on a level surface, and are continually falling over on one side or the other. They attain their full size in the

autumn, being then nearly three-quarters of an inch long, and about an eighth of an inch in diameter. They are of a yellowish white color, with a tinge of blue towards the hinder extremity, which is thick and obtuse, or rounded; a few short hairs are scattered on the surface of the body; they have six short legs, and the head is covered with a horny shell of a pale rust color.

In October they descend below the reach of frosts, and pass the winter in a torpid state. In the spring they approach towards the surface, and each one forms for itself a little cell of an oval shape by turning around a great many times, so as to compress the earth, and render the inside of the cavity hard and smooth. Within this cell the grub is transformed to a pupa during the month of May, by casting off its skin, which is pushed downwards in folds from the head to the tail. The pupa has somewhat the form of the perfected beetle: but it is of a yellowish-white color, and its short stump-like wings, its antennae, and its legs are folded on its breast; and its whole body is enclosed in a thin film, that wraps each part separately. During the month of June this filmy skin is rent, the included beetle withdraws from the encasement its body and its limbs, bursts open its earthen cell, and digs its way to the surface of the ground.

Thus the various changes, from the egg to the full development of the perfect beetle, are complete within the space of one year.

Such being the metamorphoses and habits of these insects, it is evident that we cannot attack them in the egg, the grub, or the pupa state: the enemy in these stages is beyond our reach, and is subject to the control only of the natural but unknown means appointed by the Author of Nature to keep the insect tribe in check. When they have issued from their subterranean retreats, and have congregated upon our vines, trees, and other vegetable productions, in the complete enjoyment of propensities, we must unite our efforts to seize and crush the invaders. They must indeed be crushed, scalded, or burned, to deprive them of life, for they are not affected by any of the applications usually found destructive to other insects. Experience has proved the utility of gathering them by hand, or of shaking or brushing them from the plants into tin vessels containing a little water.

They should be collected daily during the period of their visitation, and committed to the flames or to scalding water.

Mr. John Lowell, of Massachusetts, states that in 1823 he discovered on a solitary apple tree the rose bugs in such vast numbers as could not be described, and would not be believed if they were described, or at least none but an ocular witness could conceive of their numbers. He put sheets under the trees, shook them down and burned them.

They have appeared at different times in several localities in this State, attacking the grape vines, apples, and peaches.

About four years ago they were discovered on the lake shore near this place, and have been spreading to the eastward, and increasing in numbers, until now they are a scourge, injuring vines, plum, and cherry trees: they are also very destructive to the young peaches, frequently fifteen or twenty burrowing in and consuming the entire fruit. We have tried some of the insect remedies, but find none that will destroy or disperse them.

Mr. James Satterlee of Greenville, gave an essay on

OUR FRIENDS, THE BIRDS.

There is something of fascination in the study of the general habits and characteristics of birds. Such men as Wilson and Audubon have spent years, we might say their whole lives, in their study and classification. More recently, Brewer, Baird, Cones, and others, have been adding to the work done by these earlier ornithologists. These men all agree as to the value of birds in their relation to man. But it is not until within the last twenty years that the value of birds to the agriculturist and the horticulturist has been appreciated by many. And there are still many who consider the birds as nuisances, or look upon them with indifference. A few of their earnest friends have stood by them through thick and thin, and now in most of the States there are upon the statute books laws protecting, not only the game birds part of the year, but the song birds through all the year.

There is much to learn regarding the habits of many of our common birds. There is enough known, however, to prove to any careful observer, that they are of great benefit in the destruction of the worst enemies the farmer and fruit-raiser have to contend with, the insects. Of many species these are the sole food during the entire year; of many others they constitute the principal food for the greater part of the year; and with nearly all, save the rapacious tribes, they are their only food during the nesting season. To hold the insect world in check, then, is their natural work in the economy of nature. And they do this work faithfully. With ninety-nine one-hundredths of our land birds, the first morsel of food they ever swallow is an insect in some form. Were they taken out of the universe the whole economy of nature would be changed. They fill a large place; a place which can be filled with nothing else. From the equator to the frozen oceans they are the same cheerful workers.

Birds are divided, for convenience in classification, into insectivorous, those that subsist almost entirely upon insects; granivorous, those that subsist upon grain, seeds, etc.; and omnivorous, those that are indiscriminate feeders. We might also divide them into forest and field birds, and also, into land and water birds. But with the water birds we have little to do in connection with our subject. The forest birds also seem of little importance in their relation to agriculture and horticulture. We know not, however, how many species of insects they prevent from becoming civilized and thus learning to attack our field crops. These forest birds, also, sometimes change their habits, become familiar with man, and take up their residence with him, becoming speedily accustomed to his ways.

The cliff swallow is an example of this, and has changed his nesting place from high rocky cliffs to the eaves of our barns. And I have noticed recently an increasing familiarity on the part of orioles, tanagers, catbirds, and others. The forest, of course, was the original home of all our birds, and on account of the shy habits of many, will always continue to be their home. The forest birds, however, play as important a part in their own sphere as the field birds do in their sphere, for there are numerous species of insects that attack the leaves and bodies of trees, that are destroyed by such birds as the flycatchers, nuthatches, and others. As the forests are cut away the insects which serve as food for the birds become scarcer or begin to prey upon the trees and crops planted by man. The birds are thus obliged to seek them out in the fields and

orchards. In doing this work the birds change their sly habits and soon seek our friendship and protection.

It is said there are thirty species of destructive insects that prey upon our garden vegetables, fifty upon grape vines, seventy-five upon apple trees, and upon our shade and ornamental trees, at least one hundred. Predacious and parasitic insects are constantly destroying many of these species, and with the potato beetle, chinch bug, and others, not relished by the birds, these are our main dependence. Yet the great majority of these insects are eagerly sought by the birds, and are destroyed by them in countless numbers.

The swallows are the natural guardians of the atmosphere; the flycatchers and sylvians, of the foliage; the nuthatches and creepers, of the branches; while the woodpeckers guard our forest timber from the attack of borers; and the insects that infest the soil are preyed upon by the robins, blackbirds, and crows. So we might say that our earth is surrounded by an atmosphere of birds, of which the highest strata is made up of swallows, nighthawks, etc.; the next lower by the flycatchers and sylvians; beneath this, the nuthatches and creepers; then the woodpeckers, and last of all, those that seek their food upon the surface or in the soil.

Among these latter are found some of our most industrious friends, such as the robin and crow. About the services of these there is much dispute. I have seen a small flock of the latter working for many days upon a field of corn, digging cutworms from the hills, never disturbing a single kernel. I have also observed them working upon a field of newly sown oats in the same manner. Doubtless in localities where they are numerous and their insect food scarce, they attack the young corn. This may also be the case with the blackbird. At my place I have never known them to do the least harm. It is interesting to watch the robin in his search for insects. Hopping along apparently unconcerned, he suddenly stops, gives two or three vigorous pecks upon the earth and draws forth some luckless cutworm or other larva. The number of insects thus destroyed in a single day seems almost incredible. And yet from his habit of taking his pay from our early cherry trees and selecting for his own benefit some of our choicest strawberries and raspberries, he has many enemies among the fruit-raisers. Mr. J. A. Allen of Springfield, Mass., has investigated the habits of the robin pretty thoroughly and says we can well afford to spare him a share of our early fruits, if necessary, for his principal food proves him to be not only the friend of the farmer but of the fruit grower as well. Some object to him because of the familiarity of his ways and the obtrusiveness with which he presents his claims. They say he has no particle of aristocratic taste. This may be true, yet I like the way in which he does the business for the "bugs," and, certainly, when he looks one in the face with that confident air of his, he has all the appearance of conscious honesty.

I like the jay for his cheerful presence during our long winters, and the little corn he takes, I give willingly. But he is frequently accused of robbing, and should probably be classed among our doubtful friends. He certainly has a bad reputation among his fellows, for he is quarrelsome and yet cowardly, being easily driven away by the robin. He takes great care of his young, watching over it with tender solicitude until fully grown. I saw a pair, not long since, that had had their nest destroyed by a red squirrel, mourning over their loss, and scolding for many days before beginning again their summer's work.

I might go over a list of all our common birds, would time and space permit, but it hardly seems necessary. There is a question with many about the value

of the catbird, orioles, thrushes, etc., for they are certainly fond of our early cherries. The harm they do is very apparent, while the good they do is hidden from our eyes; as I said before in connection with the forest birds, we know not what insects they prevent from becoming too numerous to be managed by man. It is not safe to assume that we can get along without them. There is a fact in connection with this subject right here, and that is that I have not found the record of a single voice lifted up against any of these species in the transactions of any eastern society. It is from the newer portions of our country that all complaint comes. Possibly, this is from a difference in the habits of the same bird; but it seems to me more probable that it is from the scarcity of fruit at the west. I find the birds are highly valued for their services in France, in England, in Denmark, in Germany, and in Japan they are protected with great care.

Besides these birds, about which there is a difference of opinion, there are many others, such as the bluebird, meadow lark, sparrows, and many more too numerous to mention, that are considered by all to be the best of friends to the farmer and fruit raiser.

In addition to these insect-eating birds, the smaller owls and one or two species of hawk are beneficial, as they destroy numbers of mice, rats, moles, etc. The majority of the hawks are injurious on account of their destroying other birds. The great horned owl proves sometimes a nuisance in the robbing of hen-roosts. And I have seen a snowy owl take a quail from a flock upon my farm for a number of days in succession. Whenever he could find them far away from the barn or woods, he was sure to swoop down upon them and carry one away for his dinner.

I had almost forgotten to mention the butcher bird as being among our friends. Besides destroying great numbers of insects, he is very fond of mice. I saw one last autumn carry away four in succession that had escaped from different shocks of corn-stalks that I was drawing at the time. It is sometimes said that birds will increase in any locality just in proportion to the early small fruits grown there. This is not true, for they increase in proportion to the facility with which they are enabled to rear their young, and the larvæ of insects is their main dependence. In the summer of 1868, when the seventeen year cicada was so numerous in Illinois, the small fruits were left untouched by the birds, thus proving that when insects are to be obtained they are to be preferred.

I am aware that the present is an unfortunate time to advocate indiscriminate friendship to birds here in a new country where many are trying to get a few of their first crop of early cherries, or some perfect specimen of a new strawberry, and are finding it very difficult on account of some of these same greedy friends. But I trust the good sense of the people will not permit them to act in a hasty manner in the destruction of their apparent enemies. The time will certainly come, here as it has in older parts of our country, when the birds will be cheerfully protected for the good work they do. Let me urge, then, a compliance with the requirements of the bird laws, and I would, also, urge a careful study and observance of the habits of all our common birds, for there is much yet to learn in regard to their food, their migrations, their change of habits, etc., all of which will well repay one for the time spent in their study, and it is possible that some of the disputed points regarding their habits may thus be settled.

Quite a lengthy discussion followed this paper, of which an abstract is given below :

The Secretary quoted from Mr. Bradfield, of Ada, who said if there was no return of our feathered tribes from the south each spring, he felt that he could have full as good success in fighting insects.

Prof. Beal.—I am a friend to birds generally, but think it is right to make a judicious selection of the ones I like best for intimate companionship. There are some birds I do not like at all, and among these I rank the robin, the cherry-bird and the sapsucker that girdles our evergreens. A great deal of sentiment is thrown away on these birds, but I believe them to do more hurt than good when we are cultivating small fruits.

A. G. Gulley.—I am in favor of the birds, and it will be found pretty generally that our South Haven people, even if a large part of their income is derived from their small fruits, are still in favor of giving protection to the robin. Birds have in their manners and habits a great deal of interest to me. I have during the past summer watched with keen pleasure the habits of the kill-deer as it strove to protect its nest by pretensions of being disabled, thus leading the observer away from her nest.

Mr. Bailey.—I cannot agree with Prof. Beal as regards the robin at all. My observation has been that they do much more good in destroying insects, by eating and gathering for their young, than they steal fruit.

Prof. Beal.—I am aware that they help in this way, but the young birds are just at the age when they eat the most as small fruits come on, and they will leave worms any time to feed upon cherries or berries.

Mr. Lyon.—I must add my word of commendation upon the good work of the birds, and the cheapest way I have found to deal with them is to plant enough for them and me too, and get my pay in the benefits they are not slow to confer.

Mr. Thompson.—I am interested in getting at the sense of the meeting on this matter, and offer the following resolution :

Resolved, That the robin is not a nuisance, but a friend, and should be invited to remain with us.

Mr. Adams.—If this comes to a vote I trust none will be allowed to act unless interested practically in growing small fruits.

Mr. Gulley.—There will be no doubt of the result in the vote upon this question by a South Haven audience. We all go for keeping the robin here.

Mr. Adams.—Sentiment of course will rule in a vote like this, but when the robins come in unnumbered flocks, stealing the fruit, a vote of stones is in order.

The vote was taken, and although the room was filled, there were but ten negatives.

Prof. Beal having announced his vote against the robin, Mr. Bailey inquired if that was the vote of the Agricultural College, whereupon he was informed that there was a division of opinion there, and one professor (Cook) would hold up both hands for the robin.

Mr. Hulbert.—There are two sides to this bird question. Some seem to have bird on the brain, and go for saving the whole feathered tribe; while, on the other hand, many speak only in indiscriminate condemnation. I have watched birds a great deal, and nearly all of them are my friends. There are a few that I desire to have a good way off. For instance, the blue jay, which attacks the young of other birds, but is a great coward, and dare not meet a full grown

robin. I account him a cowardly thief, and would banish him from my premises. The American shrike, or butcher bird, is another enemy to small birds. The cedar bird eats more than he is worth, while the small hawk ranks among the class that "devour widows' houses." The robin seems to rank about half way between the friends and foes, and I acknowledge myself to be open to conviction, but in the vote I had to give him the benefit of a doubt and stand in his favor.

The next topic for discussion was

THE BEST ANNUALS AND PERENNIALS FOR HOME CULTURE.

The President called upon Mr. Knapp to open the discussion, who arose and excused himself from taking the initiatory on the ground that a better man was with him, who could do the subject that justice which was due to it, and introduced Mr. Gibson, of Jackson.

Mr. Gibson.—I have been given a pretty good send off by Mr. Knapp, and scarcely think I can come up to his recommendation save in one particular. He said I could tell all I knew about flowers, which is probably true, and it will not take long either. I am very much interested in the cultivation of plants and flowers, and find in caring for them, watching their habits, and noting their development, the best kind of amusement and relief from my regular work. And in the beautiful atmosphere that they bring about a home I take the most emphatic delight. By bringing the beauties of the floral kingdom into and about our homes, we are taking the most effectual method to drive away all somberness, all tendency to moroseness, not so much from the simple fact of their presence as from the interest engendered in their growth and habits. One becomes so easily enamored by their fresh beautiful forms that there is nothing that acts as so effectual an antidote to "the blues." We have a cold climate, and plants and flowers do not grow with such spontaneity as at the south; but with care their forms and colors are full as delicate. Perennials are generally the best for us to cultivate, and as a sample of one of the newer beautiful plants I mention two species of columbine. One known as the Rocky Mountain variety has a very large blue blossom, and the other is the large yellow variety, both so far in advance of the other sorts, and just as hardy and easy of cultivation. Some varieties of perennial phlox are exceedingly beautiful. The colors are strong, and with other flowers, form striking contrasts that are exceedingly attractive. I have grown phlox with trusses six inches in diameter. Another beautiful plant that is comparatively new to me is the large double campanula, with the calyx turning back away from the corolla. Among annuals I think a great deal of the balsams, that blossom so long and continuously. They grow well anywhere and under all sorts of culture. Their beauty may be greatly enhanced by carefully pinching back the lateral branches, giving more opportunity for the display of the flowers, and on this manner of treatment grow to be taller, finer plants in every way.

I wish to say a word regarding greenhouse plants. A good many may be grown in our houses during the colder season and then planted out in summer with the best effect. Of course we need to study their habits and requirements as to light, and heat, and protection. I have in mind now a plant that has done wonderfully under such treatment on Mr. Knapp's premises. I know of no common name for it—the *Arundo donax*. I find plants under this sort of

care last a great deal longer than many of us imagine. The achimenes planted out in pots or vases, and put beneath the shade of some overhanging tree, presents a beautiful appearance and does remarkably well. Mr. Knapp and I have been doing considerable in the way of getting foreign varieties of plants. We import the seeds and succeed in getting some novel as well as beautiful things. We find we are safe in ordering anything among annuals that does well in the climate north of the northern part of France. The great difficulty that most of us experience is the want of knowledge concerning the requirements of individual plants, and this can come only through the school of experience—and a delightful school it is in which to learn these lessons. An example of the results of this lack of information comes to my mind: One sends for the best bulb he can obtain of *Lilium auratum*, a nice round bed is spaded up and richly manured preparatory to receiving the bulb, and this is the last of it. No flowers, nothing for all the labor and patience. What can be the reason for this? Why the simple fact that this bulb will not flourish in a rich soil, the preparation was overdone. We are liable to overdo many things in the care of plants, because of our anxiety to succeed admirably.

Now just a word regarding our flower friends for winter. It is then, if ever, we wish their companionship and cheerfulness. When nature is at ebb tide if we can have a likeness of her best to look upon we are certainly fortunate. To do this we must copy her ways. This can be done in some measure by utilizing the windows of a house on the sunny sides; but it is far better to have a little house on purpose. I know the term greenhouse suggests great things that cost a good deal of money; but to those who are satisfied to begin in a small way the way is easily provided. I built a little house 12x20 feet, heated it with flues and a coal stove, at a total cost of \$50. This is not very extravagant certainly, and for me and my family it has been an immense success. I have been able to raise almost anything, and particularly in the growing of flowering plants I could not ask for much more successful effort than this. To be sure it is nicer to heat with water, but this costs a good deal, and I am speaking of things we can get cheaply that will bring sunshine to our gloomiest hours.

Mr. Knapp.—I can endorse every word my friend Gibson has said in so much better way than I could, but wish to add a word about tropical and foliage plants. They are worthy of greater attention than is given them and they are not so difficult of management as many are disposed to think, and many of them I find bring me greater satisfaction than the flowering plants: I refer to plants like the agaves, yuccas, dracaenas, palms, etc. It is a great pleasure to learn about these plants, and when it is generally known that they can be grown and employed with fine effect in out-of-door decorations for summer, I apprehend they will come to occupy a more prominent place among the plants that we enjoy raising. The great mistake too often made is in thinking that plants, because they are tropical, cannot receive too much sun. No greater error could be made. I have spent considerable time in the climate of Florida and find they are not subjected to the scorching sun that we have here. We have extremes of heat and cold, dry and wet that follow each other closely, and we need to avoid these as much as possible, so that in planting out many of these rare southern plants on the lawn, we need to seek shade rather than sunshine. Ladies often destroy the vitality of their house-plants by over-watering them, soaking their roots continually when in a dormant state, after the fall in temperature. An example of very common failure occurs to me now in the keeping of bulbs. They as well as tube roses and caladiums, require a dry warm place

to keep perfect in the dormant season. I find the variegated yuccas and the palms are proving very hardy with us, and can be carried through very nicely in a common greenhouse. I wish to see them planted more.

Mr. Gibson.—I wish to add a word more of my experience. I have very fine success with the begonias. One new one unfolds a flower three inches in diameter and the blossoms grow in triplets. I have also a geranium, a cross between a striped variety and one with a large blossom. The new plant grew up first like the striated sort, another branch came out with the leaf and blossom of the other. It is a matter of great interest to me to watch these productions.

Mr. Adams.—The reason why more people do not grow flowers is that they do not know what to plant, and are laboring under the error that they are costly luxuries. I will name a few kinds that I have found very well adapted to home gardens. Among annuals: phlox drummondi, asters, balsams, petunias portulacca, sweet alyssum. Among perennials: Double hollyhocks, stocks, wall flowers, columbine, pansies, perennial phlox.

Mr. Gulley.—The amaranths give a glory to flower beds through the whole season, and caladiums and cannas are easily grown, giving a tropical effect to the borders.

The closing address of the evening was upon the topic,

THE MANUFACTURE OF WINE AND CIDER NOT POMOLOGICAL.

BY HON. A. S. DYCKMAN, OF SOUTH HAVEN.

Pomology, like all things finite, may be supposed to have a proper limitation and consistency in its make up. If it is something that may be localized, we propose in this present writing, to look a little to its boundary lines. If it is something that has individuality, we propose to trace the conformation of its parts, and see to what heights and depths its extremities reach, and this for the specific purpose of showing its relation or non-relation to wine and cider-making.

Pomology is defined to be the "art or science of raising fruit." Perhaps it might be more properly called the "art and science of raising fruit," since it is both an art and a science. William Saunders, superintendent of the Government Horticultural Grounds at Washington, said to us, "Pomology is not a science," and instanced the fact that pomologists failed to identify varieties of fruit in many cases: showing that there are no certain rules by which pomological questions can be determined.

But does this not rather show a lack of art in the application of the principles of pomologic science? The nice, cultivated perception of things only attained by long practice, pertains to art and not science. But, without entering further into the discussion of this point, we will proceed upon the broader ground that pomology has become both an *art* and a *science*—the art and science of raising fruit. The word fruit is not used in its generic sense, but applies to a certain line of fruits, as, in this latitude, apples, pears, peaches, plums, grapes, the berries, etc. By strict construction pomology has to do with the *raising* of these. Planting, cultivation, pruning, thinning, gathering and delivery complete the process. These fruit productions enter the commercial

world and thenceforth become merchandise. They are without the pale of pomology.

It may be remarked that the fruit while in the hands of the grower may undergo a process of preparation for market. Grapes may be converted into *wine*, apples into *cider*.

But, in the process of this conversion, the fruits of the vine and tree are destroyed—lose their identity completely, and the resultant offspring of violence is not “fruit” in the proper pomologic sense. The blood of the crushed fruit becomes the production of a distinct art, assumes a character and supplies a use entirely foreign to the original. Unlike dried or canned preparations it becomes a new creation, a simple article of manufacture.

The original fruit has very little more to do with determining the character of the alcoholic fluid, than the various kinds of wood in a mechanical structure. Indeed, very nearly the same thing may be made with material from other sources. Not only is the art distinct from pomology, but to be followed successfully requires expert workmen, educated in this special pursuit, as well as large capital invested in buildings and appliances. In other words it is a business by itself.

The ordinary worm-juice of windfall apples, with which farmers reproach the business of cider-making, and domestic wines worthy of some harder name than wine, but for the untold evil of their insidious ways, would be hardly worthy of mention.

At such as these professional makers turn away in disgust. They present the imperfect results of dabbling in outside affairs not legitimate to agriculture nor pomology. Indeed it would be quite as rational and practical for farmers to undertake the manufacture of their surplus wheat and corn into highwines without the necessary appliances for that purpose. And if they did succeed in this it would not be agriculture, nor have any nearer relation to agriculture than has the commerce that floats upon the high seas.

Agriculture does not follow her productions through the mills nor over the main, but works content within her own rural borders. She presides over the garden, the orchard, the vineyard, the meadow, and the grain-land. Neither the forge, nor the work-shop, nor the ship-yard, nor the mill, nor the distillery, nor the wine nor cider press are *hers*.

We love to personify the genius of agriculture as a beautiful, pure, liberally endowed woman, upon whom to bestow our admiration,—and who shall say the figure is not an appropriate one? Her delight is in the sunshine and in the rain, in the dew and in the meadow brook, in the distillations of the heavens and the filtrations of the underlying sands. Her eyes are not bleared with wine, nor her breath polluted with the disgusting odors of the *still*, nor her cheeks reddened with the fire of alcohol.

She rules in her own proper domain with a high consciousness of power. She loves and tenderly cares for her own, and herein finds the full fruition of her life and hopes. But to see what bounds may be set to that part of agriculture embraced in our pomology, let it be considered in the light of homogeneal construction. There is a certain relation of form and quality in natural structures by which every component part may be identified.

Then where in pomology is there a place for wine and cider? The life of the pomologist is necessarily one of active industry. Intoxicating drinks bring idleness. Pomological pursuits incite the mind to many interesting inquiries. Intoxicating drinks prostrate the mind unto sheer indifference. Pomology fills

the earth with gladness, "makes the desert blossom," multiplies the endearments of home, and watches each sacred *care* with assiduous devotion. Intoxicating drinks, while they destroy the mind, bring a corresponding decay of home and its surroundings.

Pomology—alcohol—write them together! Do they give a like impression to the eye? "Sound them?" Do they fall in concord upon the ear? The *one* suggests health and long life and happy firesides, the *other* poverty, vice, misery, crime, delirium and death. *One* is honorable and profitable, the *other* is an unmitigated curse infecting the very air with its breath of poison. *One* is elevating in its tendency—its watch-word ever "excelsior," the other is tracked by one decadence after another in its downward course, until it ends in darkness and in horror.

The one builds, the other destroys. The one is fair and fresh as the "early May," the other is loathsome and repulsive. The one is prized by the good and pure, the other is the instrument of all evil in the hands of the vicious and the fallen. The one has for its prototype the original garden of obedience and innocence, the other the first gratification of sensual taste resulting in shame and expulsion. The one leads its votaries into halls of wisdom and enjoyment like the present, the other drags them to the poorhouse and the prison.

Shall we lead pomology, this beautiful bride, clothed in purity, garlanded with flowers, on whose brow shines the radiance of morning, and whose roseate fingers scatter blessings on her way—shall we lead her to the altar, to join her bright, apparent destiny with that of the dark demon alcohol?

Oh, most unholy alliance, let us "forbid the bans." In the name of God and humanity let it be commanded! Do you say, "let us have a little *light wine* and *sweet cider*?" Ah! there is the incipient evil that steals upon us unawares to sow the seeds of coming sorrow, that will surely strike root in the heart-soil, and feed upon the soul's decay.

Mothers, as you love your children, and would leave them an inheritance of virtue and honor and happiness, Oh, beware of the social glass of wine or cider in the *home circle*. Let not the sacred name of mother be associated in their minds with the recollection of their departure from the straight line of sobriety. Let not your loving hands present to their trusting lips even the semblance of maddening alcohol.

The wines of commerce contain from six to twenty-five per cent of alcohol. Your domestic wines, by additions of sugar, produce a large per centage of alcohol. Cider, after the first few hours from the press, is alcoholic in a greater or less degree. If it has power to arouse the sleeping devil of appetite in the reformed drunkard, can it be proper nourishment for babes? Doctor Reynolds spoke from the truth of bitter experience when he called it the "devil's kindling wood."

Oh, proud man, strong only in self-opinion, yield to reason rather than temptation, and so find the grandest assertion of your manhood.

As pomologists, with what policy of action do we meet our enemies? We use all prevention. We nip them in the bud. We uproot them in their incipient growth. We destroy them before their work of devastation is accomplished.

With the *same* wisdom let us restrain the appetite for wine and cider ere it grow into an absorbing passion, as by indulgence it will be able to hurl its victim to despair.

Let us preserve the fruits of our labors, in their normal health-giving qualities, and prevent from the councils and records of our pomology, all incongru-

ous elements, such as the manufacture of alcohol, under the specious guise of cider and wine—especially the domestic article.

Thursday Morning.

There having been some additional fruit brought in, Messrs. Gulley and Stearns were elected as a committee to supplement the report already given by the committee on fruits.

The topic for morning discussion was:

WATER IN HORTICULTURE—HOW CAN WE EMPLOY IT TO THE BEST ADVANTAGE ARTIFICIALLY?

Mr. Merriman.—I regard this as a topic of the time. We have plenty of water below us, but oftentimes just as we want it the most there is none to come from above us, and as yet there seems to be no adequate means employed to bring it from below. Windmills with reservoirs attached can be used for this purpose with success and economy, and I suggest that while farmers are employing the windmill for watering their stock that they elevate a tank from which to distribute to their lawns, their gardens, and small fruit patches in times of drouth. By some such method as this we may not always be held at bay by the weather and without anything with which to defend ourselves.

Mr. Clubb.—Although we are located in a high northern latitude, still the heat of the sun is exceedingly powerful in summer, and if during this season of excessive heat there is a long interval between rains, crops suffer more or less severely. I am not so much in favor of windmills for all places as my friend Merriman, for I have a cheaper process. I have seen on this lake shore large tracts of uncultivated land, level yet comparatively high, known as swamp land, left as the lake receded from its old boundaries, that are valuable, yet made of no value whatever. In them I have found numerous springs of water. The beavers in some instances have set the example and dammed the water, thus producing a system of irrigation on their own hook. They have taught us a lesson if we will only use it, the same lesson that is put into practice in California and Colorado. We have a great acreage of just such land that can be managed in the same way, just the place for economical irrigation for cranberries, strawberries, and huckleberries. The circumstances can be chiefly arranged so that one shall be independent of water from the clouds. It only requires the skill of earnest men to make these marshes mines of untold wealth. I think it would be well for the State Pomological Society to appoint a committee to investigate this matter and suggest measures for the development of this latent wealth in many of our Michigan marshes. We are poor and still have these sources of large income at our very doors. These lands have been largely legislated away, and have become the prey of speculators who have no more idea how to develop them than a South African, even if they had a desire to do so.

Mr. Stearns.—I am interested in this matter of artificial watering, and wish to present a new phase of it. The question of how to apply the water when it is in our grasp is a grave one, and even when it is attempted on a very small scale, grave errors are very often committed. I scarcely ever sell a bill of trees to an orchardist without the question is asked: "How shall I water them?" I

place a great deal of stress upon the proper use of water, but a majority of those who set out trees employ it to their disadvantage. The water is poured upon the surface and often never reaches the mouths of the tree, and the baking of the wet soil in the hot sun is a positive disadvantage. I use water while setting a tree before I finish putting in the earth, and in such manner as to have it moisten the soil immediately about the roots, then put dry earth above. I have an illustration in hand where one thousand cabbage plants were put out, five hundred were planted and watered afterward, five hundred were set in the water and dry earth hauled around afterward, the result was that the first lot succumbed almost entirely to a hot sun while the last lot lived and did well.

Mr. Dyckman.—Would you put water about newly set maple trees in the spring if the weather was quite dry?

Mr. Stearns.—I would most certainly, and by digging away some of the surface earth first see that the water reached the desired spot, then haul the dirt back again.

Mr. Thompson.—I understand that Mr. Davis of Kalamazoo, when he wants something particularly nice in the strawberry line for his market, goes to Mr. Dunkley, who irrigates his strawberry field by means of water drawn up by a windmill, and makes it pay too.

Mr. Fox.—I am quite well acquainted with Mr. Dunkley's plan. He raises some water with a windmill, but his main supply comes from a pond which is fed by a little rill. His field is so arranged on an inclined plane that he conveys the water by a wooden box along the head of his rows, and by openings along at intervals he is enabled to run a stream of water down his rows of strawberries when he likes. He mulches his ground, and the water passing along under the mulch gives the vines its full effect. The result is an astonishing growth of vines, and when it comes to berries they are of the finest and best. As regards the watering of trees, I do not advocate it in the least, because a majority of those who might employ it would pour it on the roots, washing the earth away, leaving as bad a condition of things as our friend Lannin had in the pear orchard where the moles undermined his trees. I have had rare success in planting out trees with no water at all, and I simply cultivate when most people would water. Thorough and continuous stirring of the soil is better in my opinion than watering.

Mr. Stearns.—I wish to add a word about Mr. Dunkley's irrigation. He has raised Seneca Chief plants this season that have borne a quart apiece under his method, and having a natural spring above the level of his patch of strawberries it is not expensive for him to manage the watering.

Mr. Spooner.—I have had very good success in using beneath trees transplanted a few pieces of potato in place of watering.

Mr. Clubb.—I believe in using beach sand in place of so much watering. On the top of our highest sand dunes, where the surface is a dry blowing sand, you need to scrape only beneath the surface slightly to find permanent moisture, and when trees are planted on this drifting sand there are scarcely any that ever die from the effect of drouth. This sand makes an excellent mulch to hold moisture.

Mr. Garfield.—I wish to add my mite to the discussion upon this topic. I am in favor of using water in transplanting plants and trees, and cultivating them during the dry weather, too, and I am strongly opposed to the sprinkling of the surface every day during a continuous drouth. Nothing could work greater injury. I have an instance to give you. A bed of geraniums came

under my observation, and the owner was exceedingly desirous of saving them during a drouth. They were given a pretty good sprinkling every night. They seemed to do no better under this treatment, and I investigated them, finding that they had been expending their energies in throwing out roots into this surface-soil to drink up the water, only to have the roots themselves destroyed by the bright noonday sun. Watering must be thorough, or it is worthless. A good way to water a flower bed is to set single lengths of tile here and there perpendicular to the surface, and pour the water into them, to be distributed where it will do the most good. I transplant thousands of small plants each year, and rarely have any failures, and still never wait an hour for a rainy or cloudy sky. My labor is such that the plants must be planted during the warmest part of the afternoon. In putting out strawberry plants, cabbages, cauliflowers, tomatoes, or anything else, I pursue the same method: One hand digs small holes, another follows putting in a little water, and others finish by setting the plants in the water and mud, drawing dry earth around the surface. It is a very rapid and successful process.

Mr. Anderson.—I can bear testimony upon this method, it is the very best. I always employ it in my garden and never have a failure, as my garden will bear witness.

M. Hulbert.—Another reason against watering on the surface is that evaporation is a cooling process, and by putting the water on top of the ground the plants are subjected to violent changes from heat to cold and heat again. Considerable has been said about our dry sand. We have not enough sand here. In fact, from personal experience, I know that sand will stand drouth better than clay.

COMMITTEE REPORTS.

The following are some of the reports of committees that were given just previous to adjournment:

FRUIT PACKAGES.

Your committee on fruit packages have taken a good look at those on exhibition, and have the pleasure of reporting that we found four styles of peach baskets from the South Haven factory which seem admirably fitted for the purpose intended, and the berry boxes seem to be well suited to the trade. We have no criticism to make beyond recommending them for use.

Respectfully submitted,

A. B. GULLEY,
A. DYCKMAN.

The committee to supplement the report already made on fruit, submitted as follows on

APPLES.

Your committee find seven varieties of apples of 1876, presented by L. L. Lance, of Ganges, Michigan. Among these a plate of Baldwins that are very fine, a plate of Red Cheek pippins, one of Rhode Island Greening, and specimens of Northern Spy and a sweet apple, all of which were in a fine state of preservation. They were kept in an open bin in a cellar, the cellar being ventilated in cold weather and closed when warm.

J. N. STEARNS,
A. G. GULLEY.

PLANTS AND FLOWERS.

Your committee would say they are very much gratified in the very unusual display of flowers exhibited, especially in the varieties of roses. We find on exhibition twenty-five varieties, exhibited by the Lake Shore Nursery Association, many of which are of very recent introduction and very superior. Among the varieties in this collection may be found the following: John Hopper, Gen. Jacqueminot, Baron Provost, Mad. Plantier, Priest, and many others.

One very fine fuchsia by C. J. Monroe, one stock gilliflower, said to have bloomed for the past nine months; four fine bouquets from Lake Shore Nursery Association; two from D. C. Loveday; one very fine round bouquet from John Williams; also one from H. J. Linderman, composed of carnations, roses, etc.; one very fine grown abutilon by Mrs. J. J. Atherly; four well grown geraniums, but not in flower, by Mrs. Cook.

This entire exhibition of flowers may be said to be very superior in every respect, and merit the thanks of this society, which, on behalf of this society we hereby tender. All of which is respectfully submitted.

H. DALE ADAMS,
MRS. C. J. MONROE,
MRS. C. W. GARFIELD,
Committee.

RESOLUTIONS.

Your committee on resolutions find much for which the members of this convention feel grateful:

The decorations of the hall where the meetings have been so pleasantly held, first attracted our attention: Over the platform a beautiful arch formed of the graceful boughs of the European Larch clothed the exquisitely delicate foliage of that favorite tree, over which on a heavy cornice of dense green, the white and red roses, in former times the emblems of political contention, and even of bloody strife among our English progenitors, are here happily blended in the formation of the word "WELCOME," and our experience while staying in South Haven has proved that this is an expression which forms the key-note of free, generous and unostentatious sentiment not only of our brother pomologists of the local society, but of the entire citizenship. The rose is held in high esteem as a queen among flowers and as an emblem it is expressive of the richest sentiment of the human heart; its profusion on this occasion is a most appropriate and happy feature. The magnificent fuchsia assuming the dimensions of a tree, which was contributed by Mr. C. J. Monroe; the geraniums contributed by Mrs. E. M. Cook; the abutilon contributed by J. J. Atherly; the bouquets, larches and evergreens contributed by the Lake Shore, and the Phillips & Williams nurseries, and the floral contributions of Mrs. Loveday, Williams, Linderman and others, some of whose names could not be ascertained, are all so many silent but eloquent expressions of good will which even the rich language of our mother tongue fails to furnish an adequate response.

The contributions of strawberries and cherries, already reported on by the appropriate committee, forms an important feature, not only of the decorations of the hall, but as showing the results of careful selection and culture, add materially to the knowledge of the capabilities of new varieties and the substantial enjoyment of this occasion.

The address of welcome by Mr. C. J. Monroe, already responded to, was one which will be held in grateful remembrance as among the pleasant occurrences at South Haven.

The trip on the lake so generously tendered by Captain J. M. Mitchell of the beautiful steamer *Riverside*, which gave some of our members a taste of Lake Michigan in one of its moods, with which all travelers on our inland sea are familiar, afforded both pleasure and experience to some of our interior residents.

The visit to the factory of Mr. A. R. Holcomb, the South Haven basket factory, where the maximum of excellence and the minimum of cheapness in the production of fruit baskets and crates appear to have been achieved, convinces your committee that a great desideratum in regard to fruit packages has here been accomplished in a manner deserving the highest commendation of this society. Mechanical skill is keeping pace with pomological progress, and both are well exemplified in what we have seen here.

The visit to the peach farm of ex-President Dyckman, who is leading in an important feature of fruit culture, the thinning process, which seems likely to solve the problem of annual productiveness and longevity in fruit trees, has been one of great interest and profit.

The visit, so far as practical, to the other fruit farms and gardens, and the development during the discussions of the practices in connection with fruit culture; the destruction of pests and the preservation of birds; the arrangements for transportation by lake and by rail, and the better security in business transactions with the trade in distant cities; in fact all the experience attained in the present meeting of the State Pomological Society, show commendable progress in numerous details connected with the business, and are proper subjects of congratulation.

Added to all this, for which our pomological friends are chiefly to be thanked, the generous hospitality of the South Haven citizens who have so freely opened their pleasant homes to the various delegates from distant parts of the State, and thereby made this visit an occasion of unlimited enjoyment, and your committee recommend as a very inadequate response the passage of the following resolutions:

Resolved, That the thanks of this Convention of the State Pomological Society be and are hereby tendered to their brother fruit growers and to the citizens of South Haven, and especially to the committee of reception and arrangements, Messrs. A. G. Gulley, H. J. Linderman and Geo. L. Seaver; to the Lake Shore nurseries, to Messrs. Phillips & Williams, to Mr. C. J. Monroe, to Mr. E. M. Cook, to Mr. A. R. Holcomb, to Captain J. M. Mitchell, and ex-President Dyckman, and to all who have contributed by their essays and speeches to the profit and enjoyment of this Convention by which the June meeting of 1877 has been rendered so successful as to become ever memorable in the annals of the society.

Resolved, That we congratulate the pomologists of South Haven on the substantial and intelligent progress made in fruit culture in their highly favored locality.

Resolved, That the important problem of successful and profitable fruit culture is being well solved in this vicinity, and we commend the careful, intelligent methods pursued here to fruit growers generally as well calculated to promote the highest interests of pomology in the State of Michigan.

Respectfully submitted.

HENRY S. CLUBB,
J. P. THOMPSON,
Committee.

After the acceptance and adoption of the above reports the society adjourned *sine die*.

MEETING OF THE EXECUTIVE COMMITTEE.

A bare quorum of the Executive Committee met at South Haven at its June meeting, but several matters of importance were discussed and acted upon.

After the reading and approval of the minutes of the last session, Mr. Thompson, the former secretary, spoke of the life membership certificates that had not been issued—that were due—one to Mrs. L. C. Lincoln, of Greenville, and the son of George Taylor, of Kalamazoo. He then spoke at some length of the plan adopted by the State Agricultural Society at the State Fair, of having division superintendents, who are wholly responsible for matters in their special departments. These superintendents see that committees do their duty by everybody, and at the first meeting succeeding the fair of the Executive Committee, they make a detailed report of the exhibition in their departments, with such suggestions as are deemed advisable for future conduct in the various divisions. Mr. Thompson strongly recommended that a similar course be adopted by the State Pomological Society, so that the whole fair shall be conducted upon the same plan.

On motion of Mr. Adams the plan recommended by Mr. Thompson was adopted, and a committee consisting of Messrs. Lyon, Garfield and Chilson, were chosen to decide upon the subdivisions and the appointments, with power to fill vacancies and select, also, a superintendent of Pomological Hall. Mr. Henry G. Reynolds, of Old Mission, was chosen to the last position.

The secretary and chairman of the finance committee were instructed to provide the officers of the fair with appropriate badges. The secretary reported that he was making fair progress in collecting back reports, and in exchanging with other States. He was instructed to proceed at his discretion in exchanging for volumes of other States and societies, and thus as rapidly as possible build up a library of some value to the society.

In the matter of distributing the volumes of the society's proceedings for 1876, the Executive Committee empowered the President, the Secretary, and E. H. Reynolds, of Monroe, to have full authority in the matter.

A communication was read from President Wilder, of the American Pomological Society, requesting that a delegate be appointed to the Baltimore meeting of that society in November next. The power of appointment was conferred upon the President, Secretary, and Prof. Beal, with the understanding that no expense should be incurred for the Society to pay.

The following communication was received from Mr. Kedzie, chairman of the committee on meteorology:

To the Honorable Executive Committee of the State Pomological Society:

In attempting to solve the question assigned me by your honorable committee, viz.: The influence of forests upon the climate of this State, meteorological observations are of great importance. Whether the partial destruction of our forests has made our summers hotter and dryer, and our winters colder, can probably only be answered by referring to meteorological observations extending over a series of years. But the number of weather stations in this State is very small, and the record of the weather kept very imperfect, therefore the observations which can be obtained are of very little use for my purpose.

In order to make clear this vexed question of climate, would it not be advisable for the State Pomological Society to establish in various parts of the State, especially in the fruit belt stations, where continuous observations upon the

weather should be complete (including the barometer, winds, clouds, etc.), but simply the record of the temperature of the open air at 7 A. M., 2 P. M., and 9 P. M.; the maximum and minimum temperature for each day, and the rainfall. The results of these observations could be reported to the Secretary of the Pomological Society at the end of each month, and embodied in the annual reports.

The probable cost of establishing each weather station is as follows:

One standard air thermometer.....	\$3 00
One maximum thermometer.....	3 00
One minimum thermometer.....	3 00
Rain gauge.....	1 50
Total.....	<hr/> \$10 50

These are the "outside figures." If several thermometers are ordered they can be obtained at reduced rates. I feel sure that there are persons in all parts of this State, who would be willing and glad to aid the cause of pomology by taking observations. These few suggestions are respectfully submitted, confident that the executive committee will decide wisely in the matter.

Very respectfully,

ROBT. F. KEDZIE.

AGRICULTURAL COLLEGE, June 15, 1877.

The Treasurer thought the expense would not be warranted by the condition of our finances notwithstanding the good that might, and would, probably, come out of the establishment of these stations.

Mr. Lyon said the instruments were already at South Haven, and that one station could be established without expense.

Mr. Garfield believed that there were men like Mr. Parmelee and Mr. Reynolds, of Old Mission, who would interest themselves in that vicinity sufficiently to see that accurate reports were furnished. Mr. Reynolds, of Monroe, was instructed to secure, if possible, a station at Monroe. The matter is of sufficient importance to localities to induce the people to furnish such reports gladly.

The whole subject was placed in the hands of the President, Secretary, E. H. Reynolds, and George Parmelee, with instructions to act immediately in the matter.

A communication was read from the Calvert Lithographing Company, of Detroit, offering to make a design and furnish stones for a diploma 19x24 inches, for \$200.

As the society must have a diploma for its fair in September, this communication was referred to a committee consisting of Messrs. Webber, Adams, and Garfield, with instructions to procure a suitable diploma for the society, and secure not more than 100 copies, nor less than 50 copies, in season for the State Fair of 1877. Subsequently, by vote of the society, Mr. Lyon was added to the committee.

On motion of Mr. Adams, the Secretary was instructed to withdraw the check and account for illustrating Prof. Cook's article on the cabbage worm.

In explanation, Mr. Adams said it was not desirable to print articles in our annual reports not pomological in their character.

The Executive Committee then proceeded to ballot for members of the orchard

committee, which resulted in the following selections: Prof. W. J. Beal, Lansing, chairman, A. G. Gulley, of South Haven, and C. N. Merriman, of Grand Rapids, members.

CHAS. W. GARFIELD,
Secretary.

Moved and supported that we fix the salary of the Secretary at \$400.00. Carried.

Moved that the Secretary be allowed \$50.00 for extra services in compiling the report of 1876, and that said action do not establish a precedent in the future, and that Secretary Garfield be requested to finish the work of the report, keep accurate account of all time spent on said report, and present the same to the Executive Committee for their consideration. Carried.

N. CHILSON,
Secretary, pro tem.

MEETING OF THE EXECUTIVE BOARD.

A meeting of the Executive committee of the State Pomological Society was called to meet at the office of Prof. J. C. Holmes, in Detroit, Thursday evening, July 12th.

At 7 o'clock the meeting was called to order, and, in absence of President Lyon, Mr. E. H. Reynolds, of Monroe, was called to the chair.

At the request of the members present certain portions of the proceedings of the last two meetings were read by the Secretary. The law was read under which the society was incorporated, and Mr. Webber explained that the society could not prescribe any narrower limits for its work than indicated in this statute, until the statute itself is changed. At this juncture Mr. Calvert, of the Calvert Lithographing Company, came in with a design for a diploma for inspection, and on motion the Board proceeded to the consideration of the matter of a diploma. After some time spent in viewing the design, on motion the further consideration and adoption of the design was referred to the next session of the Board. The Secretary was instructed to notify the absent members that the design would be in the hands of the Calvert Company and request them to call and look at it, making such suggestions as they see fit to its improvement.

On motion, the action taken at South Haven, instructing the Secretary to withdraw the account and check for illustrating Prof. Cook's cabbage-worm article was reconsidered.

On motion, further action on the matter was indefinitely postponed.

By request the Secretary read the following from the minutes of the South Haven meeting:

"Moved and supported that we fix the salary of the Secretary at \$400. Carried.

"Moved that the Secretary be allowed \$50 for extra service in compiling the report of 1876, and that said action shall not be considered a precedent in the future, and that the Secretary be requested to finish the work of the report, keeping accurate account of all time spent on the said report, and present the same to the executive board for their consideration. Carried."

On motion, this action regarding the Secretary's salary was made to take effect at the close of the present year.

On motion, the Secretary, in the preparation of the annual report, was instructed to comply with the statute under which our society is incorporated.

The Secretary made a report upon the volumes of back reports that had passed through his hands, which was accepted and ordered published with the minutes. The following is the report:

Statement of the account of back volumes of the proceedings of the State Pomological Society, kept by the Secretary:

At the opening of the year when I came into the office of Secretary there was not a complete set of our reports in the library, and in accordance with the action of the Executive Board, I proceeded at once to solicit for them among parties that had received packages from year to year. I have kept an accurate account of all the volumes received as well as the volumes sent away, and the following is a summary of the account: Receipts: Volume of 1871, 11 copies; of 1872, 125 copies; of 1873, 88 copies; of 1874, 96 copies; of 1875, 338 copies. Disbursements: Volume of 1871, 4 copies; 1872, 8 copies; of 1873, 8 copies; of 1874, 22 copies; 1875, 112 copies. Balance on hand: Volume of 1871, 7 copies; of 1872, 117 copies; of 1873, 80 copies; of 1874, 74 copies; of 1875, 226 copies.

It is quite desirable that there should be added to these as many as we can get of '71, '73 and '74, for the calls from abroad for sets of our volumes are numerous and should be heeded.

Board adjourned.

CHAS. W. GARFIELD,
Secretary.

SUPPLEMENTARY PAPERS.

PREPARED EXPRESSLY FOR THE VOLUME OF 1877.

Immediately after the June meeting at South Haven, several parties were addressed for papers to place in the annual report of the society. It was thought desirable that in the papers thus prepared there should be a balance maintained between science and its application, and those who read can best judge of the success of the effort.

The article by Mr. Halsted is a carefully prepared paper upon a topic which comes home to the grape growers of Michigan, and will be valuable as giving accurate statements regarding the growth and propagation of the parasitic plant, that is such an enemy to the vineyard. To properly defend ourselves against enemies we need to know their habits, strength and methods of warfare, and in this paper Mr. Halsted has given us just this kind of knowledge—the result of long and careful examination of the grape mildew.

The article by M. B. Williams of Saugatuck, on “Growing Peaches for Market,” is the carefully prepared opinion of an orchardist whose experience in the growing of peaches has been large, and who speaks from no theories, but gives the result of his long practice.

Professor Prescott’s paper upon “The Chemistry of Fruit Ripening” is full of suggestions that are invaluable to the practical fruit grower, and the readers of this volume will long have reason for gratitude toward the author of this article so kindly furnished them.

Prof. Prentiss’ address gives just the estimate of the education acquired at our Agricultural Colleges that we all need to carefully weigh, and we wish to call especial attention to his estimate of that knowledge which gives appreciation of the beautiful things in nature and in art, and which gives to life that satisfaction which cannot be bought with money nor lost with age.

The concluding article by the Secretary simply records the results of a few years of experience combined with some explanation of the reasons for success in the most approved methods of transplanting.

THE AMERICAN GRAPE MILDEW.

(*Peronospora viticola*, B. & C.)

BY BYRON D. HALSTED, M. S.

There is probably no cultivated plant that is made the home and means of support of a larger number of parasites, both animal and vegetable, than the grape vine.

The injury done by the phylloxera and other insects, forms a distinct chapter in the diseases of the grape, and one that must be left for other hands and at some other time. In fact the list of Fungi which thrive upon our vineyards is so long, that for the present paper we are forced to confine our attention largely to a single one, namely: the American Grape Mildew, or *Peronospora viticola*, B. and C., as it is styled in Botany. It is hoped that with the aid of a plate we may be able to make the description of this pest sufficiently plain so that it will not be confounded with any other grape fungus or mistaken for galls or other insect work.

The grape mildew of which we are to treat is a fungus, we have said. But what is a fungus? It is a member of the group *fungi*, one of the divisions of those plants which never produce flowers and seeds, and are called cryptogams; some of the other orders of which are ferns, mosses, lichens, and seaweeds. Of the group fungi the mushroom and toadstool are among the largest and most familiar members. The moulds which sometimes grow on our bread, cake, and other articles of food are good examples of those smaller kinds like the species of which we are now prepared to speak.

In order to become more thoroughly acquainted with the prevalence of the mildew a list of four questions was made as follows and sent to several of the leading grape growers in various parts of the United States:

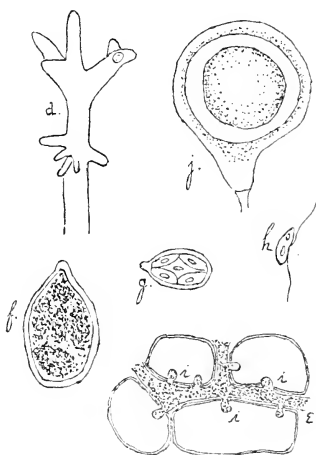
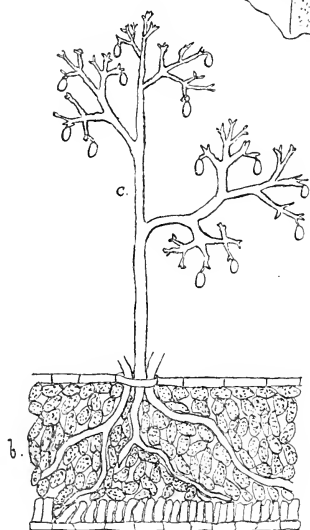
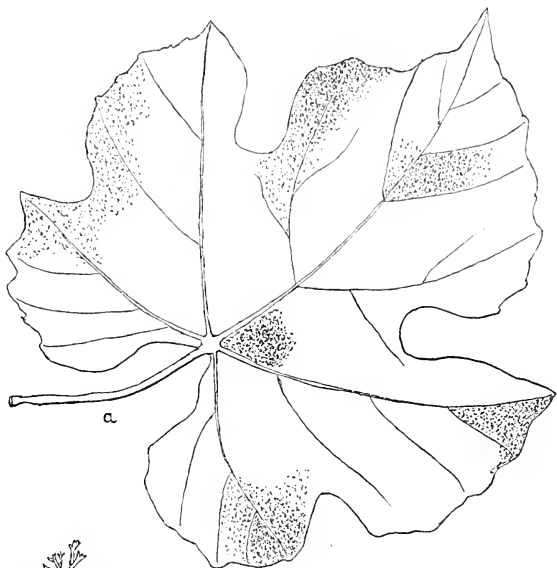
1st. Are you troubled with the grape mildew; and if so, for how long a time and to what extent?

2d. About what time does it make its appearance with you; and what are its first manifestations?

3d. How would you describe the disease?

4th. What remedies have you used; with the results of each?

An earnest request was also added for any further information upon the subject.



THE AMERICAN GRAPE MILDEW.

EXPLANATION OF THE PLATE.

a. Leaf of *Vitis astivalis* showing the under side with the spots affected by the mildew darkened.

b. Cross-section through a leaf showing the threads of the fungus running between the cells.

c. Where the threads have passed out a stoma on the underside of the leaf and branched in a tree-like manner bearing spores on their tips.

d. One of the tips in *c* very highly magnified.

e. Cells of grape with threads passing between them, all very much enlarged.

f. Asexual spore highly magnified showing the primular protoplasmic contents collecting into oval bodies.

g. Asexual spore less magnified with the division of the contents completed.

h. One of the zoöspores after it has escaped, and provided with two cilia.

i, i. Haustoria or "suckers" on the embedded filaments penetrating the cells of the grape plant.

j. Sexual (oöspore) spore separated from the tissue of the grape leaf and magnified about 750 diameters.

Figures *d*, *g*, *h*, and *j* are copied from Dr. Farlow's plates on *Peronospora* in the Bulletin of the Bussey Institution.

The replies which have been received have in many cases been prompt and full, and in the treatment of the subject the language of the writers will be frequently used.

While the answers to the questions were coming in, some time was spent in looking up the literature of the grape disease. Frequent mention of it was found far back in the old volumes of the New England Farmer, Horticulturist, and other agricultural and horticultural journals, but the descriptions were usually so incomplete and unsatisfactory that it is not worth our while to quote passages to prove the fact,—suffice it to say that our grape vines have been the seat of various and often destructive attacks by fungi from early time, and as is perfectly natural, the subject has received considerable attention at the hands of agricultural and horticultural writers, who have mingled much theory in their discussions, and have assigned all imaginable primary causes for their development, from certain kinds of electricity to bad air.

Let us first get a clear conception of the *Peronospora* as it appears to us to the naked eye, after which we will observe it more minutely under the compound microscope. As one passes through a vineyard in midsummer he may frequently notice that the grape leaves are more or less covered with yellowish spots: should we take one of these leaves, thus seemingly taking on its autumnal tints, and turn it over, we will find that the under surface of just those yellowish portions are covered with a fine white forest growth of a shiny, frosty appearance. Here on the underside of the leaf we then find the external evidences of the cause of the discoloration which we saw upon the upper side. Figure *a* in the plate represents a leaf of *Vitis aestivalis*, showing the under side with affected portions darkened.

Those species of grapes, as for example *V. cordifolia* and the one figured, which have a smooth surface to the leaves, exhibit the mildew much more favorably than those like *V. labrusca* with a downy covering. Our mildew, then, grows in frosty spots upon the underside of the leaves, causing a discoloration noticeable upon the upper side. Farther than this we cannot go without the microscope.

When one makes a thin cross section through a leaf at one of these diseased places and puts it under a moderately high power of the microscope, something like what is figured in *b* and *c* is observed. The section of the grape leaf is shown in *b*. (It must be kept in mind that the underside of the section is for sake of convenience placed uppermost in the drawing.)

Below them are two rows of cells placed close together, forming the dense upper portion of the leaf, followed by a mass of loosely arranged cells which contain the green coloring matter, and do the work of assimilation for the plant.

Running irregularly between these cells are shown the threads (mycelium) of the fungus much enlarged that they may be the better seen. Instead of growing directly through the cells they press their way between them, and at intervals put out little projections called *haustoria* or “suckers,” which penetrate the wall of the cells and rob them of their contents. At *e* is shown a highly magnified view of a few cells with a portion of a thread of the peronospora between them, and having the haustoria passing into the interior of the cells.

When the leaf is first attacked it is only these threads in the interior of the cells that can be found, but soon they turn towards the under side and finding the breathing pores (stomata), they pass out sometimes to the number of a dozen from each stoma. After this they begin a series of branchings, and finally each assumes the form of a miniature tree, one of which is represented in *c*. It

is the vast multitude of these little branched tops which gives the white, frosty appearance when viewed with the naked eye. Upon the extremities of the ultimate branches the *asexual* spores are borne, singly, but as these branches are very numerous, as the reader may judge, when *d* represents a highly magnified view of one of the extreme tips as given in *c*, the number of these spores which is formed upon a single spot must be enormous. At *f* is represented one of these spores with its granular contents tending to collect in ovoid masses. It is these little spores which are the means of propagating the disease so rapidly from place to place, and therefore the subject of their germination is important.

The ordinary method of germination of spores in fungi and other cryptogams is by a simple prolongation of their contents into a tube on one or more sides which finally elongate into threads; but in this species and some of its near relations like the potato rot, the process is quite different, and is styled *germination by zoospores*. In this case the contents of the spore is divided up into from six to ten oval bodies, which finally rupture the spore wall and then escape, each being provided with two little hair-like processes by which they are enabled to move about. Their movement lasts from ten to twenty minutes, gradually growing slower, when they finally come to rest, send out a tube and grow much after an ordinary spore. Here, then, we have each spore producing a number of smaller motile bodies, which, after finding a suitable place, germinate,—a very prolific method for the propagation and spread of the disease.

Under the head of the germination of these asexual spores Dr. Farlow has performed some interesting experiments. He finds they germinate equally well in the dark as in the light. Those sown in the morning germinate more quickly and abundantly than those in the afternoon. "It was not possible to keep the spores which were formed in the night until the afternoon, as they generally fell from their attachments in the morning and began to germinate. In all cases the germination took place with surprising regularity." At the expiration of an hour and a quarter the contents of the spores had formed small oval bodies which before long ruptured the cell wall and made their escape from the mother cell. "They passed out rather slowly, usually one at a time, and paused for a moment in front of the opening where they remained as if not quite free from one another. In a short time each body began to extricate itself from the common mass, move more and more slowly, and finally dart off a full fledged zoospore."

At *g* is represented a spore with its contents divided up into zoospores, and *h* one of these motile spores separated and provided with its cilia.

We see, then, that when a single diseased spot has produced its spores, they germinate in a few hours, and there are a multitude of these moving zoospores produced therefrom, which move to a new place on the same or another leaf, and there coming to rest, send their threads into the leaf, and a new seat of destruction is soon established.

Besides these spores which we have just described as asexual (*comdial*), and produced simply by the formation and separation of single cells at the extremities of the branched external filaments, there is another kind called sexual (oöspores) spores because of their method of formation. They are always formed from the mycelium *within* the tissue of the grape plant, and may, therefore, be styled subterranean in distinction from the others, which are aerial.

They are called sexual spores because it is necessary that the contents of two different threads should mingle in order that one of these spores may arise.

In essence this union of the contents of two cells is all that there is in the sexual reproduction in flowering plants, though in another and perhaps more evident manner. There is involved in the production of a seed, the male element represented by the pollen grain, and the female part called the embryonal vesicle. Here we have the male represented by the tip of one filament and the female by the enlarged extremity of another, and after union has taken place the latter develops into an oöspore,—one of which is represented highly magnified at *f*.

These spores are larger than the aërial ones, and are well provided with a thick covering of cellulose. As they are embedded in the tissue of the grape leaf they can serve no purpose in the immediate spreading of the disease. In fact they are not usually formed until late in the season, and their special office undoubtedly is to carry the mildew over the severe months of winter. In the spring they germinate by zoöspores similar to what has been said on this point with the asexual spores. These little motile bodies finding their way to the fresh leaves of the grape vine cause a repetition of the trouble of the previous years and of the circumstances which we have just described.

There is another grape mildew which is sometimes confounded with the one in question, though they have little in common except being both fungi and growing on the grape. It is closely related to the *Oidium Tuckeri*, which has proved so disastrous at different times to the vineyards of Europe and Madeira. Botanically it is *Uncinula spiralis*, and we will call it Oidium when occasion demands its further mention in the treatment of this paper. The Oidium, unlike the Peronospora, is a surface grower entirely, never sending its threads down through the tissue of the leaf, and besides is not confined to the under side. Running here and there over the surface of the leaves, young stems, and berries, it gives, with the aid of a hand lens, a fine cobwebby appearance to the surface, and after it has formed its multitude of spores the parts affected look to the naked eye as if they had been dusted with flour. It never has those well defined frosty spores characteristic of the Peronospora, and usually develops itself earlier in the season, and is more deliberate in its progress. Its sexual spores are superficial, and when ripe are enclosed in a thick brown covering of sufficient size to be seen with the naked eye.

The fact that the Oidium often attacks the young grapes makes this mildew quite destructive. As is often the case, the two kinds grow well together, which fact makes it very difficult to decide how much injury is to be attributed to each one.

The *Uncinula* is treated by Dr. Farlow in Part II. of Vol. II. of the Bulletin of the Bussey Institution, where a full page plate of this mildew may be found.

As regards the time of the appearance of the Peronospora, the literature, letters and personal experience on the subject lead to the conclusion that it depends very largely upon the nature of the weather, in general appearing at any time from the first of June to the last of September. A series of warm showers alternating with bright sunshine is especially favorable for the development of this fungus, as of most of the other species of the vast group. This year I found it in abundance after the warm rainy weather of the middle of June. It is evident that the variety of grape may determine to some extent the time of its advent. To this conclusion the following observation points: when a number of seedling vines of *V. aestivalis* in the nurseries of the Arnold Arboretum were

thoroughly infested, those of the *V. labrusca* in the same row showed no traces of the mildew; but ten days later both kinds were equally affected, and up to time of writing, September 12th, plants of *V. cordifolia* var. *riparia* have still escaped.

To consider further this point, let us give some of the experience of others. "The fungus which we are now considering is very abundant on *Vitis æstivalis*, Michx. *V. labrusca* and all their cultivated varieties; on *V. cordifolia*, on *V. vulpina*, and the cultivated Catawba grape, and in fact on nearly all varieties of American grapes, although we have not as yet heard of its occurring on the Diana grape. It is probably found throughout the whole United States east of the Rocky Mountains, but it has not yet been reported from the west coast. It has been said not to occur on the smooth-leaved species; but its presence on *V. cordifolia* proves the contrary. It has also been said that it does not occur on the varieties of *V. vinifera* growing in this country. As we have not had an opportunity in this region of examining such varieties growing in the open air we cannot controvert this point, but our experiments prove that it can be made to grow on *V. vinifera*, and even more luxuriantly than on American species."*

Among the letters received, one from Michigan says: "The Croton was the only variety much affected last year. * * * I do not think I gathered a single perfect bunch; almost the entire crop of this variety was ruined. My Delawares did not seem to be affected to any perceptible extent."

Another party from Indiana tells us "The varieties most affected with us are *thin leaved* varieties, such as Rogers' Hybrids, Iona, and Diana. Such heavy leaved varieties as Ives' Seedling, Concord, and Hartford are scarcely ever affected unless the weather is so bad as to totally destroy other kinds."

From Ohio comes word that "The *Peronospora* mildew is more prevalent on varieties from American stock, and the surface mildew or '*Oidium*' prefers the European, though under favorable circumstances both may be found on all."

A Massachusetts grape grower, among other items, sends the following; "I grow in quantity only the Concord, which shows an average mildew amounting to considerable less than one per cent in depreciation of the crop. The maximum never being more than two to three per cent. Other varieties are much more prone to mildew, and one that I believe never failed so long as I grew it (until three years ago), was Rogers' No. 15 (Agawam)."

Let us look at the description of the fungus. "The date of its first appearance with us has always been from the 10th to the 15th of July. It appears as a shining mouldiness upon the peduncle of the berry and extending from its insertion over the berry more or less. It occurs first near the ground, that is, the lower clusters, more especially if densely shaded." This is evidently the *Oidium*. Further confirmation was received a short time ago in the shape of the mildew itself. The writer distinguishes the two kinds of mildew, because in the same letter, after speaking of the Concord, he says: "Some of the other varieties are somewhat prone to a form of mildew which is developed not on the berries but exclusively upon the leaves. The Delaware, Croton, and some others are quite liable to it." This is evidently our subject, but it also grows in the berries, as figure *e*, showing the thread and "suckers" in the grape tissue, was drawn from a section through a Concord berry kindly sent by this gentleman. These berries affected by the *Peronospora* are covered by no mouldiness, but

* Dr. Farlow on American Grape Mildew, in Bussey Bulletin, Vol. I., pp. 421, 422.

appear prematurely ripened, having a red color and irregular outline, and "will remain sour, and hard, and worthless."

Another noted grape grower of the same State, in speaking of the *Peronospora*, because it is "a fungus attacking the under side of the leaf," says: "Some varieties, like the Concord, Clinton, etc., in which there is no foreign blood, generally escape, while hybrids, so-called, more properly, perhaps, cross-bred varieties, suffer very much, and should there happen to be two or three bad years in succession, are often destroyed."

From Connecticut: "Some of the more tender varieties are affected; of these the Allen, Rebecca, Massasoit, Delaware, Wilder, and Isabella, in the order named, are susceptible. While the Concord, Ives, Hartford, Clinton and others are about exempt. * * * To the ordinary observer the grape mildew exhibits discolored patches on the leaf."

Another has been much troubled with the mildew. "The Isabella, Delaware, Rogers' Hybrids, Iona, and Diana being most susceptible."

From Michigan again: "I have not been much troubled with the mildew until last season, when it injuriously affected almost every vine in my vineyard."

The description of the disease leaves no doubt that it is the *Peronospora viticola*. From his excellent remarks we should judge that he had no varieties which are proof against the disease. "All choice varieties are liable to be affected."

From a prominent writer on horticultural subjects in Ohio, I receive the following generalizations as regards the susceptibility of grape vines and mildew: "I have not examined at all critically the varieties (or species) of mildew on our vines, but I think there are two, the white or *Oidium* and the rusty or *Peronospora* sort. The former most common on the vines of the European (*V. vinifera*) and the hybrids (partly European), and the latter mostly confined to American grapes; but I think I have found the *Peronospora* on foreign grapes, as I am sure I have the *Oidium* on American. By request a package of diseased leaves was kindly sent, the contents of which was as follows: "No. 1, Allen's Hybrids, partly foreign." This was badly affected with the *Oidium*, and only one small spot of the *Peronospora* was to be found. "No. 2, small shoots and leaves of Delaware, most often injured by mildew." The *Peronospora* was very abundant on the leaves, and evidently had been at work some time (Sept. 7th). Some of the *Oidium* was found. "No. 3, leaves of Rogers' Hybrid; these are also a part foreign." They were badly affected by the *Peronospora*, but no *Oidium*. "No. 4, leaves of Catawba; not often seriously damaged by mildew." The *Peronospora* had evidently troubled these leaves quite early in the season, though not to such an extent as in Nos. 2 and 3.

Farther items of interest in this department of the subject might be gleaned from other letters, but it is evident that the grape growers are sadly acquainted with the grape mildew, and recognize the two leading kinds. As to varieties most affected this is a more difficult question to decide. The strong thick-leaved varieties like the Concord, Ives, Hartford, and Clinton, appear to be less affected, while varieties like the Delaware, Rogers' Hybrid, Diana, Iona, and Isabella, which are tender and thin-leaved, are quite susceptible.

As far as domestic and foreign "blood" is concerned at present the facts are not in sufficient number to warrant any conclusion, as the *Peronospora* is peculiar to America; the native vines must have been its home, but this does not prevent its doing as well, or even better, on any introduced variety. Absolute proof on this point would require the coöperation of a number of observers

in all parts of the country, in all conditions and seasons of the growth of all varieties of vines, and extending over a series of years. This is more than can be expected at present. It is the impression that when the circumstances are the most favorable, any and all varieties will be more or less affected by either or both of the leading forms of mildew.

Having given an idea of the nature and extent of the trouble, the practical question of how to meet it naturally arises.

The answers to question four exhibited no great diversity of opinion, and for this we can only be thankful. One writer says: "I have used as a preventive the following wash made thus: Set a good oil barrel in the ground, fill it nearly full with water, add six pounds of potash, two gallons of coal tar, one-fourth pound carbolic acid. Use one part of this to three parts of water, applied as follows: The man takes the pail with the wash in one hand, and with a short handled swab passes along the rows, swabbing the stalks of the vines in the crotch of the arms or lower branches. A portion of the wash runs down the stock, is diluted by the rains and carried to the roots of the vine."

The writer further adds: "Sulphur, or sulphur and slacked lime, is a certain remedy if properly applied. Early, or as soon as in full leaf, and at intervals of three or four weeks until September. To apply the remedy to the seat of the disease the sulphur should find a lodgment on the under side of the leaves, hence it should be very dry and well pulverized, mixed with a small portion of lime, and applied on a dry still day by putting a portion into a cotton bag tied to the end of a stick and thoroughly shaking it among the foliage, or better still if applied with a pair of bellows or some other blowing device."

Another leading grape grower writes: "I go through the vines most liable to mildew, even before it is observed, and especially if moist hot weather sets in and cover the leaves on both sides with sulphur. Should the mildew appear, I repeat the operation two or three times during the season." He uses a bellows as do several others who have written me on this point. Flour of sulphur used with a bellows early in the season, when an ounce of preventive is worth a pound of cure, followed by a repetition of the process as circumstances will decide, seems to be the general remedy for the grape mildew.

Many other substances have been used, some of them figuring largely in the advertisements of horticultural journals. The one now being thus brought to the notice of the public in the columns of the *Garden* is called Salus. If it does all that is claimed for it the discovery is a very valuable one, but we know of no trials of it this side the waters.

As the sexual spores reside in the dead and fallen leaves through the winter, it would seem that the collecting and burning of them would do much towards diminishing the disease. Hand-picking and burning of the curled and dead leaves as fast as the *Peronospora* produces them, though good in theory involves too much time and labor to be at all practical.

As all fungi are lovers of moisture and flourish best where it is quite prevalent, the amount of the grape mildew will largely depend upon the conditions of the weather over which man has very little control. The planting of vineyards in only those localities that are either naturally dry or made so by thorough drainage will tend to avoid the disease and do good to the vines in more ways than one. "Early and overbearing are prolific sources of mildew," therefore the sharp edge of the pruning knife will do much to keep away the pest. In fact any culture that will secure the most healthy and hardy vines will be the best to prevent the diseases which prey upon them.

SUMMARY.

Grapes are attacked by many fungi and insects. Fungi form a group of flowerless plants. Of the fungi we have treated the *Peronospora viticola* in particular and the *Uncinula spiralis* in general; the former the American grape vine mildew, the latter called *Oidium*. In order to become better acquainted with them, a list of questions was sent to many of the leading grape growers in the United States. The literature on the subject, though abundant and scattered, is vague and unsatisfactory.

The *P. viticola* is one of the microscopic fungi which attacks principally the leaves, showing itself on the under side in frosty patches and upon the upper side as yellowish spots. The smooth.-eaved varieties show it best. It is a deep seated fungus, sending its mycelium all through the tissue of the leaves, having little projections which penetrate the wall of the grape cells. The asexual spores are borne on the ends of branching filaments on the surface of the leaves, and germinate by means of zoöspores in a few hours after they are formed. The little motile bodies called zoöspores are provided with two cilia, by which means they move about, and finding a new place, germinate as ordinary spores and thus establish a new growth, and thereby rapidly spread the disease. The sexual spores are formed within the tissue of the grape leaf, and are designed to carry the mildew through the winter, being provided with a thick coat of cellulose.

The *Oidium* is a surface feeder growing largely on the young berries and giving a "floury" appearance to their surface. It has no well defined spots like the *Peronospora*, and is not limited to any side of the leaf. The two kinds are often found growing together, and it is, therefore, very difficult to credit each one with its own amount of destructive work.

Though the *Peronospora* shows a preference for some varieties, probably all may be subject to its attacks. The hardy, thick leaved varieties, like Concord, Hartford, and Ives are much less troubled than the Diana, Rogers' Hybrids, and Delaware, which are styled thin-leaved and tender.

For remedy flour of sulphur dusted on with a bellows, even before the mildew has made its appearance, and as often afterwards as good judgment will decide. With this precaution, combined with all the conditions of strong, healthy vines, which with a proper selection of varieties, good soil, location, and careful culture, will secure, it is believed, the fruit of the vineyard will continue to be the laborer's liberal reward and the rich man's healthful cheer.

I was fortunate enough to be with Dr. Farlow at the time he was making his extended investigations with the *Peronospora viticola* which have since appeared in the Bussey Bulletin, and was often kindly invited by him to notice the various states and stages pointed out. So that though not having made a complete study of the disease myself, I can claim ocular demonstration to all or nearly all of the structural and other facts herein presented. To Dr. Farlow is then largely due the substance of this paper, and to him I cannot but extend my sincere thanks. I also desire to mention the names of J. B. Moore, Concord, Mass., W. N. Barnett, West Haven, Conn., Hanford & Co., Bristol, Ind., R. Haigh, Jr., South Haven, E. Bradfield, Ada, N. B. White, Norwood, Mass., Secretary M. B. Batcham, Painesville, Ohio, Jabez Fisher, Fitchburg, Mass., and our Secretary, C. W. Garfield, as gentlemen who have especially aided me with material for this paper, and to whom my hearty thanks are herein tendered.

Harvard University, September 1, 1877.

GROWING PEACHES FOR MARKET.

BY M. B. WILLIAMS, SAUGATUCK, MICHIGAN.

IS IT DESIRABLE TO ENGAGE IN PEACH CULTURE?

Before considering the general subject it, perhaps, might be well to inquire a little about the desirability of engaging in peach culture as a specialty, as some in the peach districts seem of late rather inclined to do, nearly or quite to the exclusion of all other fruits. It is not my design to present a long list of figures for the purpose of demonstrating in dollars and cents the relative profits of peach-growing, though being of the opinion that if such a list were produced, the peach would be somewhere near the top. But without giving any figures I would say that I do not consider it advisable for any one about to engage in fruit culture to confine himself entirely to peaches. I am aware that the peach crop of 1876 in this locality, as well as in other parts of Michigan, was a grand success, both in quantity and prices. Neither am I unmindful of the fact that within a radius of several hundred miles from any point in South-western Michigan there is comparatively but very little territory that is adapted to the growth of this fruit, and hence there is not so much danger of over supplying the market.

While these are interesting facts to be remembered, yet there are also other facts which ought not to be forgotten. The season of 1875 was nearly a failure so far as peaches in Michigan were concerned, while apples in the lake shore region, and also in other favored locations, yielded abundantly, and sold for remunerative prices, hence that year apples paid far better than peaches, notwithstanding the reverse was true the following season. The most enthusiastic peach-growers in the oldest and best fruit districts of the State would not claim that the peach orchard is by any means certain of affording an income every year, but like nearly every crop that grows, it is occasionally liable to fail. The same reasons which make it better for the farmers to produce a variety of crops, rather than depend entirely upon one, apply equally as well to the fruit-grower. Let him plant liberally of various kinds, then in seasons when one fails another may succeed, for in no year will all be likely to fail, if in any place worthy to be called a fruit country. I do not wish to be understood as cautioning against growing peaches more than any other one kind of fruit, but on the contrary I believe that in situations which are adapted to their growth they will be found quite as profitable as anything else that can be produced.

And as the measure of profit and success will depend largely upon the care and intelligence manifested in the management of the trees, and selection of varieties, I will endeavor to present a few ideas on those points, as they appear to me after several years of experience and observation in the business. But as my experience has been confined almost entirely to one locality, viz.: on the eastern shore of Lake Michigan, near the mouth of the Kalamazoo River, my remarks, especially on varieties, will undoubtedly apply more particularly to that point, and perhaps adjacent and similar ones.

LOCATION.

As before intimated, a favorable location is indispensable to one who would expect to succeed in growing peaches profitably. A place having convenient facilities for shipping to a good market, and that is capable of bringing forth the largest number of crops, and the least failures, in a term of years, undoubtedly possesses the most important advantages to be obtained. After the general locality has been decided upon, the particular spot chosen should be high and elevated enough at least, so that frost and cold air will not be inclined to settle over it, as it would over a low piece of ground, and it must not be wet, as peach trees positively refuse to submit to wet feet and thrive. They will occasionally, when standing on ground that could not be called more than very moderately wet, at most, appear to be doing quite well, for perhaps several years, yet they almost invariably fail before giving any satisfactory returns, unless proper drainage is furnished to such soils.

SELECTION OF TREES.

Having the ground in order, or rather some time before it was prepared, we should have attended to getting good trees, of suitable varieties, and this is a task which we find beset with difficulties on every side, yet upon its successful accomplishment depends to a very great extent the future profits of our orchard, and severe, indeed, will be our disappointment if, after spending years of toil and care, we discover that our varieties are worthless, and we were either mistaken as to the kinds best adapted to our location, or cheated by those from whom we obtained our trees. One thing which may help to avoid this latter, is, never to purchase from a traveling tree agent until we are first satisfied that he is employed by some responsible, careful, and honorable firm, who have a business and reputation which they cannot afford to lose or injure, or allow to be injured, by misrepresentation on the part of their agents. If we should happen to be so unfortunate as to deal with one who is willing to beat us if he can, the chances are greatly against us. But after having done all we can to ascertain that we are dealing with honest men, and if such is really the case, still our varieties should be selected by description, and not by name, for it frequently happens that a peach which is known in one locality by a particular name, in the second locality, is applied to an entirely different peach; but by having the nurseryman give a description of what he sells under any name, we will be enabled to judge—having, of course, first learned for ourselves the description of such varieties as we wish to plant—whether or not that is the variety we want. It makes no difference what they are called, provided we can only get the actual variety we desire. Another and more certain way to do this is to get some pits from good healthy seedling trees, plant and bud them ourselves, taking from trees buds we have seen in bearing, and hence know to be

desirable, whether we know what they are called or not. But this would require two years more time and a little practical knowledge and skill, which all do not possess, and still less are willing to practice.

CHOICE OF VARIETIES.

Let us now notice some of the varieties which seem to be the most desirable, beginning with the first in the order of ripening. There are several of the newer kinds, such as Alexander, Beatrice, etc., which I have not yet fruited, and which are said to ripen some time before Hale's Early. From what I can learn I think that some of them will prove desirable, and will head the list, as it is well to extend the season both ways as far as practicable. Of Hale's Early I would set a few, not because I consider it very excellent, but rather because at the time it ripens I do not know of a better one. Its size and appearance are good enough, and it is productive, but the standing objection to it is its liability to rot prematurely; but in seasons and places where it escapes this difficulty it generally proves profitable. It is thought by some to do better on light dry soils, not too rich, but probably the season often has very much to do with its rotting in any soil. After Hale's and before the Early Crawford and Barnard, there seems to be no standard variety that is generally recommended, but there are several sorts grown for the purpose of filling up this part of the season. Among these might be mentioned Early York, Coolidge's Favorite, and a peach known by some as Honest John, but it does not answer the description of that variety as given by Downing, as it has yellow flesh. It is of medium size, is somewhat slender and slow in its habit of growth, and a prolific bearer, and like others of that class liable to be small from over-bearing. The Mountain Rose was said by some to be a variety ripening at this time, and if it had proved to be so, I think it would have been a valuable acquisition, as after having fruited it for two years, I consider it an excellent peach, better than any of the others I have mentioned as ripening at this season. But with us it has ripened about with the Barnard and Early Crawford, and hence only adds another good peach to a time when we have a good supply. This is the part of the season which has sometimes been spoken of in the market as the "Crawford glut," because the peach season is then at its height, and the market more fully supplied than at any other time during the year, provided it is a year when Crawfords bear well. This brings me to a point where I may differ from many. I would not set largely of Crawfords, but in their place would substitute Barnards, because they are more certain and abundant bearers. The Crawford has undoubtedly not obtained its good popularity without some deserving cause, but it is perhaps owing to the appearance of the fruit, without much regard to the difficulty of producing it. This might not be of so much importance if in a place where peaches were considered about as certain as apples or other hardy fruits; but in Michigan, and also in many other peach districts, it must be admitted that the peach buds are liable occasionally to be partially or wholly destroyed by severe winters. The Crawford is generally considered one of the tender varieties, and if buds of that variety escape the cold unharmed most others are usually thought to be safe. Now I would not advise the cultivation of seedlings or any inferior peach because so good a fruit as the Crawford happens to be a little tender.

But the Barnard is not an inferior peach. When well grown and properly thinned it is nearly, if not quite, equal to the former in quality and appearance. Indeed, I have seen them preferred in market on account of their color, which many think looks richer and riper because it is more red.

After the Barnard I would recommend Jaques, or as it is frequently called Jaques' Rareripe. Perhaps some will wonder why I do not place Old Mixon Freestone here. Were it not for the fact that I consider it slightly open to the same objection as the Crawford—that of being less certain than some other varieties—I would place Old Mixon first on the list. In flavor and size it is all that could be desired. It is a good shipper, while in growth the tree is upright and handsome. But I have them by the side of Jaques, where the latter, although not equal in appearance, have yet proved the most profitable, on account of bearing younger and being more certain of producing a crop each year. Still I would not fail to set a few Old Mixon.

There seems to be one peculiarity about this variety which it might be well to mention. While many kinds will produce fine specimens of fruit when the trees are young, this does not appear to do so. I have now some trees, which for the first year or two of bearing, produced such inferior peaches as really to cause me to have grave doubts as to whether they were not seedlings. And yet these same trees have since produced many bushels of as nice fruit as is often seen. After Old Mixon and Jaques are disposed of, about the next in order of much value is a peach of many names, which is becoming widely known of late as Hill's Chili. I am induced to believe that this peach was imported to this country from France without any name accompanying it. In one instance, at least, with which I am acquainted, it has been traced back until it was discovered that Gen. Cass brought it from France, and hence it has been known by some as the Cass peach. But whether he was the first to introduce any trees of that kind, or others may have brought some here before him, could not be learned. One thing, however, seemed certain, that its French name, if it ever had any, was lost. But it is a profitable market peach, if on good soil, and sufficient care is taken to thin the fruit enough. If this is not done, it will be almost certain to overbear and produce small fruit. I think this variety will produce a larger amount of peaches from a given number of trees in the same time than any other kind I ever knew. Commencing to bear almost as soon as the tree is large enough to hold up a peach, it seldom or never fails, if there is any chance at all for peaches in its vicinity. The fruit when well grown is of good quality, and usually sells well in market. It comes at a time when there are not very many other varieties ripening. Most kinds coming after these are so late as not always to be depended upon, although many times Smock, Freestones, and others ripen well and prove remunerative. But these late kinds usually do not ripen until the weather has become so cool that peaches are not so much desired, and their flavor is not equal to those ripened in warmer weather; and while it would be well to get a few of them, yet they should not be planted largely. To recapitulate this subject of varieties there are the three kinds—Barnards, Jaques, and Hill's Chili—that are not only good, but they can also be relied on to produce a crop every time when any variety can, and they should be set largely. Early Crawford and Old Mixon Freestone are excellent, but not always as reliable, and hence I would plant of them more sparingly, while of the other varieties mentioned I would set more for the purpose of filling up certain parts of the season, rather than because they possess any special superiority.

TRANSPLANTING.

And now, returning to the setting out of our trees, the next thing to be decided is the distance apart. Here the "doctors disagree," various distances,

from twelve to twenty feet, being recommended. I like about eighteen feet. In laying out the orchard, each variety should be arranged in a block by itself for convenience in gathering the fruit, and also for the purpose of allowing one or more varieties to be cultivated without disturbing the others, as may sometimes be found desirable after the trees come into bearing. In planting, care should be taken not to leave the roots uncovered or exposed to the sun and wind, as we would avoid leaving a pet fish out of water. Set the trees perpendicular, instead of leaning in the direction of the prevailing wind, as is frequently done. I have seen many orchards leaned in that way in which nearly all the trees were sooner or later either blown up to a perpendicular, or so as to lean in the opposite direction. Hence, if they must come to that position, why not set them so at first, and thus avoid the strain and breaking of roots necessary to allow them to assume a position in which the wind can pass over them and meet the least possible resistance?

CULTIVATION AND PRUNING.

The cultivation of the orchard for the first few years should be thorough during the first half of the season, and then should be gradually discontinued, and during the latter part of the season should cease altogether, in order to give the new growth time to thoroughly mature, and thus be well prepared to stand the winter. If it is desired, corn or other hoed crops may be grown on the ground, provided the soil is rich enough, otherwise each crop will take nourishment from the soil which the trees will need, and hence it must be returned in some form or they will suffer. With regard to pruning, I would say, first of all, head the trees low. Just how low cannot be correctly stated, as what would be low for a spreading tree might be high for one of upright growth. I would also advocate "heading back," as it is called, that being the system recommended by most of the leading writers on the subject, and also the one which in my experience has given the best satisfaction.

Nearly every season of the year has been advocated by different persons as the best time to prune, but if any one can form an intelligent opinion from reading all that has been written on the subject I would like to know the process by which he was enabled to arrive at a conclusion. I have never experienced very thoroughly in the matter, but have generally pruned most during the warm days in winter, as I find more time for such work than at any other season of the year, and have failed to see that it was not about as good a time to prune as any other.

There is one process to which I have not alluded, which would hardly come under the head of cultivation, neither would I call it pruning, although it is done with both a hoe and knife. I refer to taking out borers. This must be attended to not less than once a year, and twice would be still better, if good healthy trees are desired. Do not trifle with any supposed remedies, but dig them out and kill them. If this is practiced carefully while the trees are young, there will be but very little injury from this cause. They do not appear to do so much damage after the trees become older. Whoever attempts to grow a good peach orchard will meet with many difficulties, but if he perseveres, any thorough care and attention which he may bestow upon it will be likely to meet a reward in the prolonged lives of the trees and increased yield of delicious fruit.

THE CHEMISTRY OF FRUIT RIPENING.

BY ALBERT B. PRESCOTT, F. C. S.

To form the seed seems to be the chief end of the plant. When in the vigor of its own maturity, and when receiving the sun's strongest rays and the earth's richest nourishment, the plant gathers all its resources, and devotes them to the building of the seed. When done, the seed itself, the embryo, commonly possesses little substance and serves little use beyond its primary purpose, the reproduction of the plant. But in *the coatings and coverings of the seed* we find a large and abundant supply of substances, in variety and quantity the rarest and richest stock in the vegetable commonwealth. Indeed, the wrappings of seed-germs constitute the especial provision for the nourishment of the human race. The seeds enveloped with starch and albuminoids, as in the cereal grains, make up "the staff of life" for man. Seeds with oily coatings, including the nuts, present a good supply of fats for food. The seeds with succulent coverings, the fruits, yield a great number of sharply defined substances, most of which claim the approval of man, and some of which require for their due application the best efforts of the human intellect. Without the grains, the fruits, and the nuts, man would be left to browse with the ox and prey with the wolf.

In this abundant material gathered around the seed-germs, chemistry has achieved more success than elsewhere in the organic world. It is well understood that chemists have no reason to boast of what they can do with the products of living cells. In an analysis of vegetable or animal products, there is always a percentage, and often a large percentage of unknown matter. It might be named "chemists' dirt;" not "matter out of place," but simply "matter unknown." It has weight, it may have color and consistence, but it responds to no inquiries and yields to no suggestions. Like an open Polar sea, it battles and invites and baffles again. But, with all due reservation for unknown bodies, the condition of organic analysis gives good ground for encouragement. Especially in this material about the seed, the analyst finds numerous compounds of clearly definite chemical character, many of them capable of sure identification and exact separation, even when taken in complex mixtures. Working with some of these compounds, an insight into their chemical structure has been obtained; so that the chemist can bring together the materials and conditions for their production. In the products of the peach, at every autumn's ripening, certain chemical changes occur in the kernel under

your hand, changes as well known to science and capable of as exact quantitative statement as the local changes of the planets in the solar system. Forty-four years ago, Liebig and his fellow workers discovered certain links in those chemical changes, in the products of the almond family, and the discovery was an era in chemical science.

The chemistry of the covered seed is of interest not only for the quality of the compounds found in it, but, quite as much, for the *history* of these compounds, *the chemical changes of seed and fruit ripening* in the plant. These changes differ in their general character from other changes of plant chemistry, coinciding more nearly with the changes of animal chemistry. Taking for study the ripening of *seeds with succulent coverings*—the fruits—the proper subject of this article,—we may undertake to compare fruit ripening with vegetable nutrition on the one hand and with animal nutrition on the other hand, as follows:

IN VEGETABLE NUTRITION.	IN FRUIT RIPENING.	IN ANIMAL NUTRITION.
1. Oxygen is given to the air.	Oxygen is taken from the air.	Oxygen is taken from the air.
2. Carbonic acid is taken from the air.	Carbonic acid is given to the air.	Carbonic acid is given to the air.
3. The service of plant-green is required.	The service of plant-green is dismissed.	.....
4. Simple compounds are changed to those more complex.	Complex compounds are changed to those more simple.	Complex compounds are changed to those more simple.
5. The expended power of the sun is stored.	The stored up power of the sun is expended.	The stored up power of the sun is expended.
6. Heat is absorbed.	Heat is liberated.	Heat is liberated.
7. The changes represent reductions and syntheses, difficult to the chemist, and hindered by atmospheric conditions.	The changes represent combustions and dissociations, and are mostly favored by atmospheric conditions.	The changes represent combustions and dissociations, such as are favored by atmospheric conditions.
8. Opposed to fermentations, and to other changes classed under the term organic decomposition.	The changes include a great number of distinct fermentations, some of which are spontaneous in the air or occur in cooking food.	Some of the changes are allied to fermentations, but are mostly not liable to occur without the living body.
9. The important compounds of the vegetable kingdom—cellulose, starch, sugar, and many acids and other products—are common to the fruit and other parts of the plant.		Only a few animal products are found in the vegetable kingdom.

Fruit ripening, then, coincides with vegetable nutrition in acting with the same substances, and coincides with animal nutrition in moving in the same direction.

To inquire, now, somewhat in detail, into the more obvious of the changes which constitute fruit ripening, we may examine the proportion and formation of the following five classes of FRUIT PRODUCTS:

1. Sugars (starches).
2. Pectous substances and gums.
3. Acids, tannin and other glucosides.
4. Ethers.
5. Alkaloids.

The analyses of fruits hitherto reported have mostly been made by European chemists. The fullest reports of ripe fruits, upon which I am in good part dependent, were made by Fresenius, from analyses under his direction, nearly twenty years ago, and represent the fruits of the Rhine district, obtained at Wiesbaden.

1. SUGARS. The prevailing sugar in fruits is *glucose* (*dextrose*), often termed grape sugar. It is the same compound that is largely manufactured from starch, and called starch sugar. It is much less sweet than cane-sugar and less abundantly soluble in water, having an oily or "mealy" taste. As made from starch, it is now much used in certain candies. When in the uncrystallizable form, *glucose* (*levulose*) is the same as "fruit-sugar," the uncrystallizable product obtained to some extent in manufacturing cane-sugar, and which forms a part of the syrups of the market. Many of the fruits contain *cane-sugar* (which is the same as beet-sugar and maple-sugar), and certain rare varieties of sugar are found in some fruits.

Buignet decided that the apple, peach, plum, raspberry, orange, and pineapple contain cane-sugar, with *glucose* (mostly as *levulose*). The sugar of the grape, cherry, gooseberry, and fig, consists wholly of *glucose*.

The average proportion of sugars in ripe fruits is given, by Fresenius, as follows (the smallest per centages being placed first):

Peaches, 1.6 per cent. (not varying very widely).

Apricots, 1.8 per cent. (from 1.1 to 2.7).

Plums, round red, 2.1 per cent. (from 2.0 to 3.5).

Greengages, 3.1 per cent.

Raspberries, 4.0 per cent. (from 3.0 to 5.0).

Blackberries, 4.4 per cent.

Strawberries, 5.7 per cent. (from 3.2 to 7.6).

Currants, 6.1 per cent. (from 4.8 to 6.6).

Gooseberries, 7.1 per cent. (from 6.0 to 8.2).

Pears, red, 7.4 per cent.

Apples, 8.4 per cent. (from 5.9 to 10.4).

Cherries, 9.8 per cent. (from 8.5 to 13.1).

[Summer peaches 11.6 per cent. Berard's analysis.]

Grapes, 14.9 per cent. (from 13 to 19).

It is seen from this list that the *sweetness* of fruit has but slight correspondence with its proportion of sugar. Currants were found to have more sugar than raspberries, blackberries or strawberries, and over three times as much as the peaches examined by Fresenius. All analysts agree in the predominance of grapes for their quantity of sugar. The sweetness of fruit is probably favored less by large proportions of sugar, than by three other conditions, namely: (1), small proportions of acids, (2) large proportions of pectous substances, (3) presence of cane-sugar instead of grape sugar.

The sugar of fruits is chiefly formed or deposited in them during their ripening. Berard found that the pulp of cherries, unripe, contained only 1.1 per cent. of sugar; ripe, 18.1 per cent.; gooseberries, unripe, 0.5 per cent.; ripe, 6.2 per cent. In 1862, Hilger determined the *sugar of grapes*, at ten periods

during their growth and ripening, as follows (Landw. Versuchsstat, xvii., 245; Jour. Chem. Soc., xxviii., 281):

	AUSTRIAN.	RIESLING.
1. June 27th.....	1.37 per cent.	1.01 per cent.
2. August 16th.....	1.33 " "	1.23 " "
3. August 23d.....	2.18 " "	1.81 " "
4. August 28th.....	4.25 " "	2.39 " "
5. September 1st.....	2.53 " "	2.58 " "
6. September 12th.....	4.49 " "	2.89 " "
7. September 17th.....	5.33 " "	3.87 " "
8. September 23d.....	7.71 " "	7.70 " "
9. October 10th.....	9.90 " "	8.64 " "
10. November 10th.....	9.90 " "	8.21 " "

Whether the *sugar of fruits is formed* within them, or introduced through the stem, and, if formed in the fruits, from what substance formed, are questions which have been investigated but not wholly settled. It has been pretty generally held that *starch* in the unripe fruits is converted into sugar in the ripe fruits; the fruit acids inducing the change, as we know they have power to do. But starch is not found in the unripe stage of all fruits, and in the cases where found, its quantity is sometimes too small to serve as the source of all the sugar of the ripened fruit. In the investigation of Hilger, above quoted, the immature fruit was at no time found by microscopic examination to contain starch. It appeared in the fruit stalks in June; after August it almost wholly disappeared from the fruit stalks, and was found only in the wood of the vines. Payen (Compt. Rend., liii, 313), reported that he had demonstrated the presence of starch in unripe fruits and its conversion to sugar during ripening; but did not ascertain how much of the sugar of fruits is formed in this way.

It has been advanced that sugar is formed *from malic and other acids*, during ripening, either in the fruit or in the parts of the plant supplying juices to the fruit. Six molecules of malic acid and six molecules of tartaric acid, with nine molecules (eighteen atoms) of oxygen, would furnish the atoms for formation of four molecules of glucose, twelve molecules of water, and twenty-four molecules of carbonic anhydride. Mercadante (Gazetta Chimica Italiana, v. 125; Jour. Chem. Soc., xcviii [1875], 904) made a series of determinations of the malic acid and sugar in plums, commencing May 20th. The quantities of both acid and sugar increased in the fruit so long as it was green and emitting oxygen in the daylight; the branches which bore the fruit containing acid and pectous substances but no sugar. During the same time, the pectous and gummy substances in the green fruit had decreased from 6 per cent of the pulp to 3 per cent of the pulp. The investigator believed the sugar of the green fruit to have been chiefly formed, in the fruit, from the pectous and gummy substances, under contact of the acids. As soon as the fruit, losing green color, began to emit carbonic acid in the daylight, the acid in it began steadily to decrease as the sugar increased. The increase of sugar at expense of the acid in the pulp of plums is shown as follows:

	SUGAR.	MALIC ACID.
June 20th.....	16.52	2.76 (p. c. in pulp)
June 24th.....	16.64	2.46 " " "
June 30th.....	16.78	2.16 " " "
July 4th.....	17.05	1.57 " " "
July 12th.....	17.38	0.82 " " "

The green plums contained *tannin*, which commenced to diminish as soon as the fruit began to emit carbonic acid in the daylight, wholly disappearing by June 20th, the date at which the malic acid began to diminish. It is well known to every one that many green fruits are very astringent, and that their tannin decreases and sometimes disappears during ripening. Also, it is a familiar fact in the chemistry of tannin that it readily undergoes changes producing sugar. This, then, is the source of a portion of the sugar of many fruits. The formation of sugar from tannin will be discussed under the head of the glucosides of fruits.

Several chemists have reported the presence of sugar-producing substances peculiar to fruits. Buignet describes a fruit constituent, astringent like tannin, and combining with iodine like starch, and serving as the source of sugar.

The proportion of *cane-sugar*, in most fruits, is generally believed to diminish by transformation into *glucose*, as fruits become fully ripe or over-ripe. But Berthelot and Buignet (*Compt. rend.*, *li*, 1094) found that, in oranges, the proportion of cane-sugar increased during ripening, the quantity of *glucose* remaining unchanged.

The increase of weight of fruits, during ripening, is no doubt largely owing to deposition of sugar. Berard found that 100 parts of unripe summer peaches yielded 179 parts of ripe fruit; and 100 parts of unripe apricots increased in ripening to 200 parts.

The maturity of fruit is the period of its maximum quantity of sugar. Sooner or later, the quantity of *sugar begins to diminish*, and then the fruit is over-ripe. It is safe to say that the sugar often begins to decompose during the life of the fruit; that is to say, fruit becomes over-ripe during its life. It would be difficult, however, to fix on the termination of the life of fruit. We certainly cannot say that life ceases when the circulation with the plant is cut off; and we cannot say that life continues in the sarcocarp until it is wholly disintegrated. Now it is within the limits of our subject to inquire *by what changes the sugar begins to disappear*.

In general terms, sugar suffers *oxidation* in ripe fruits, small portions being oxidized away even during the production of larger portions and before perfect maturity. We do not know what fruit constituents, if any, result in this oxidation. The *final* products of oxidation, carbonic acid and water, are exhaled during ripening, and with greater rapidity after maturity has been passed.

It seems to be established that sugar in fruits is liable to traces of the alcoholic *fermentation*, even before maturity is passed. H. Gutzeit (*Zeitschr. Oest. Ap. Ver.*, 1875, p. 337; *Pro. Am. Phar. Asso.*, 1876, p. 287) reports finding alcohol, or other simple compound of ethyl, in the fruits of a number of plants. Some of the fruits were not quite ripe, and none were over-ripe. De Luca (*Compt. rend.*, *lxxxiii*, 512; *Jour. Chem. Soc.*, 1876, II., 649) reports obtaining products of the alcoholic and acetic fermentations, from the fresh fruits, leaves and flowers of several plants. In all these cases, the quantities of alcohol obtained were very minute. The investigator first above named found methyl alcohol, in some cases, with the ethyl alcohol. Pasteur states that the germs which excite alcoholic fermentation are very abundant on the bunches of ripe grapes, where very rare in the atmosphere. Also, that the fermentive germs are found on ripe strawberries, cherries, and currants, but not on the same fruits unripe. The formation of methyl alcohol, above referred to, is closely allied to the formation of methyl salicylate or wintergreen oil. A number of the essential or volatile oils, with which plants and fruits are per-

fumed and flavored, contain alcohol radicals in union, as compound ethers. It is probable from every point of view, that the slight occurrence of the vinous fermentation in fruits belongs to an important class of chemical formations, by means of which a multitude of odor-giving substances are scattered throughout vegetation. We shall inquire more carefully into the fruit-flavor compounds and their formation, farther on.

2. THE PECTOUS SUBSTANCES. These are, in general terms, the constituents of plant-jelly. As vegetable products, they correspond to the varieties of gelatine obtained from animal tissues. Unlike gelatine, however, they are non-nitrogenous. They are found in the soft parts of plants generally, as in the tuber of the potato and the root of the carrot, but it is in fruits that they have most importance for edible value. The immediate origin of the pectous substances is pretty well known, being due to a specific fermentation, a prominent feature in fruit ripening. The material from which all the pectous substances proceed is the fermentable body called *pectose*, an insoluble, tasteless substance, found abundantly in unripe fruits, also to some extent in immature roots and tubers, and having no more value for food than cellulose. Now there is formed along with this substance, a "ferment," as it is called, a body which by contact induces a specific fermentation—a definite chemical change. Pectase is the name of the ferment. Just as, in the germinating seed, starch by contact with diastase suffers fermentation with production of sugar, and as, in bruised and wetted mustard seeds, sinigrin by contact with myrosin splits up into pungent oil of mustard and sugar, etc., so the crude pectose of green fruits by contact of their pectase at the time of ripening changes to the edible plant-jellies or pectous substances. Long boiling with water alone effects the same change. Why this fermentation occurs just at the ripening time and not earlier or later we do not precisely know: it may be that the pectose is just then become capable of fermentation, or the pectase then acquires potency for its office, or then and not before are other conditions of the change established. We know only that the fermentation gives us the before-mentioned pectous substances, which, moreover, succeed each other, during ripening, by repeated changes. It must be confessed that these products have been but imperfectly defined, but as a class their chief properties are known. They are given by chemists as follows (distinctions having value only in analysis, being omitted):

Pectine: readily soluble in hot or cold water, gelatinizing when concentrated and more perfectly by addition of sugar, changed by very long boiling to parapectine.

Pectic Acid: gelatinous, insoluble in cold water and but slightly soluble in hot water, hardened in jelly by solution of sugar, slowly changed by boiling to parapectic acid and afterward to metapectic acid. Pectine and Pectic Acid result from long boiling of the crude *pectose*.

Parapectine: soluble in water, capable of gelatinizing slightly, changed by boiling to metapectine.

Parapectic Acid: soluble in water, the solution changing into one of metapectic acid. Not gelatinous.

Metapectine: soluble in water, not gelatinous. (Found in over-ripe fruits).

Metapectic Acid: soluble in water, incapable of gelatinizing. (Found in over-ripe fruits. Produced by fermentation in over-ripening from all the other pectous substances. Also produced, from most of the other pectous substances, by long boiling, much more readily if acids are present).

Alkalies change pectine, and parapectine, and metapectine, to salts of pectic acid.

The properties of the separated pectous compounds represent certain well-known characteristics of fruits, as these are found in *cooking*. Moist heat, as in

any mode of cooking, produces upon these substances the chief results of ripening, and, if continued long enough, the results of over-ripening. *Unripe fruits* are made more edible and wholesome by cooking, owing to its artificial (imperfect) ripening of pectose. *Fruit jellies* owe their substance to pectic acid, pectine, and slightly to parapectine, the products of early maturity, with the coöperation of sugar. For jellies, it is well-known, the use of over-ripe fruits must be avoided, and too long boiling in the preparation must be avoided. If the fruit be under-ripe, the juice should be boiled much longer than if the fruit be fully ripe, and if the fruit be over-ripe, boiling should be maintained no longer than necessary to clarify, and standing in hot solution should be avoided. Grapes bear full ripening, for jellies.

The following statements of the *quantities of pectous substances and of pectose* are compiled from the reports of Fresenius. It should be mentioned that Fresenius found widely different quantities in the different varieties of the same fruit, and the average here drawn from the varieties of each fruit would greatly vary from an average obtained from other varieties of the same. The percentage in the fresh fruit is first given, and then percentage of solids, or strictly dry fruit, as obtained by calculation from the percentage of water.

	PECTOUS SUBSTANCES (SOLUBLE).		PECTOSE (INSOLUBLE).	
	Of Fresh Fruit.	Of Solids.	Fresh Fruit.	Solids.
Peaches—mean of 2 varieties..	8.45 per cent	42.25 per cent	0.85 per cent	4.25 per cent
Apples—mean of 4 varieties....	5.85 " "	34.41 " "	1.23 " "	6.59 " "
Pears—mean of 2 varieties.....	3.84 " "	22.58 " "	0.97 " "	5.70 " "
Raspberries—mean of 3 varieties.....	1.42 " "	10.14 " "	0.24 " "	1.71 " "
Gooseberries—mean of 6 varieties.....	1.17 " "	8.36 " "	0.65 " "	4.64 " "
Cherries—mean of 3 varieties....	1.59 " "	7.23 " "	0.78 " "	3.54 " "
Grapes—mean of 2 varieties.....	0.36 " "	2.00 " "	0.84 " "	4.66 " "
Currents—mean of 6 varieties....	0.17 " "	1.13 " "	0.84 " "	5.66 " "
Strawberries—mean of 3 varieties.....	0.10 " "	0.79 " "	0.50 " "	3.85 " "

As *food materials*, the pectous substances seem to be well-nigh indispensable to the health of man. They are not very nutritious; it is not known that they are fully digested into material which can be appropriated; and, being non-nitrogenous, they could scarcely yield tissue-building matter. What service they perform is not clearly understood. They may supply liquids important in digestion or assimilation. We obtain them in acidulous fruits, and in starchy tubers, and it is not clear how much of the value of each of these sorts of food is due to their pectous constituents; but, when all food containing pectine is cut off, the scurvy is liable to ensue, and then any food supplying pectine will serve as a remedy. At the same time, it is found that pectous food is needed only in small quantities; large proportions proving not only innutritious but injurious, causing derangements of digestion and excretion.

3. ACIDS. The principal fruit-acids, not astringent, are the following, given in the order of their importance:

Malic Acid: Very widely distributed; predominating in apples, pears, cherries, gooseberries, strawberries, raspberries, and mountain-ash berries. Not extracted for use.

Citric Acid: Found in lemons, oranges, tomatoes, currants, gooseberries, raspberries, strawberries, and a large number of other fruits, generally with malic and tartaric acids. Obtained from lemons for use.

Tartaric Acid: Also widely distributed, in most fruits not forming the chief acid, but constituting the acid of the grape. Manufactured from the deposit of fermenting grape juice; used in baking powders and in its salts, cream-of-tartar, and Rochelle's salt.

Oxalic acid is sometimes found in small proportions in a few fruits. Reports vary as to its existence in the tomato.

Fresenius' analyses give the following as the average proportions of total acid, reduced to equivalent of malic acid.

Currant.....	2.04	per cent.
Raspberry.....	1.48	" "
Strawberry.....	1.31	" "
Sour cherry.....	1.28	" "
Apple.....	0.75	" "
Grape.....	0.74	" "
Peach.....	0.67	" "
Red Pear.....	0.07	" "

The quantity of acids in fruits usually *diminishes during ripening*. The diminution is not, however, nearly so great as it appears to the taste, because the acid of ripe fruits is masked to the taste by the larger proportions of sugar and the pectous substances then present. The removal of acids is chiefly due to oxidation. It is not found that acids are neutralized, to any considerable extent, during ripening, by alkalies conveyed through the stem. The diminution of the acid in plums was shown definitely by the series of analyses before given from Mercadante. It is stated that the acids continue to oxidize away, after the sugar has reached its maximum and before it begins to diminish. Hence, perfect ripeness in fruit has been defined as that period during the maximum quantity of sugar when the quantity of acid is least. This will be, of course, just before the sugar begins to diminish.

It has been stated that both citric and malic acids are often found in unripe grapes, and are substituted by tartaric acid during the ripening. Oxalic acid is more often found in unripe than in ripe fruits. It is to be desired that closer determinations should be made as to the presence and proportion of oxalic acid in tomatoes and some other fruits. Any article of food containing oxalic acid (as the garden pie-plant) should probably be eaten with moderation, if at all.

A misapprehension sometimes occurs, from lack of reflection, as to the effect of sugar on the acidity of fruits. Sugar has no chemical effect upon acids. Its very sweet taste masks or overpowers to the sense the sour taste of free acids,—but the acids remain free, all the same. Whatever effect the sugar eaten with fruits has on digestion and nutrition is due to the sugar itself; not to any change of the acids by the sugar, for there is no such change. Indeed, sugar approaches to the nature of an acid, though properly classed as a neutral body.

The varieties of tannic acids classed together as TANNIN are quite unlike the fruit acids above mentioned, both in sensible properties and in chemical relations. Only a few of the ripe edible fruits contain astringent acids, though these are found in many unripe fruits and in numerous ripe fruits not used for food. Most varieties of colored grapes contain a little tannin deposited mostly in the skins and seeds, and imparting a slight astringency to the juice, retained

after fermentation. In the red wines, from 0.08 to 0.2 per cent. of tannin is found. The decomposition of tannin, by a fermentation producing sugar, has been mentioned under the head of sugars. Tannin is also liable to oxidation, with various products not including sugar.

The vegetable kingdom furnishes numerous compounds, known as GLUCOSIDES, which are capable of definite and distinctive fermentations, one of the fermentation-products in each instance being sugar. A number of these glucosides are found in fruits. One of the most important of these is *amygdalin*, a glucoside found in the fruits, leaves, etc., of plants of the almond family, especially in the kernels of the bitter almond, peach and cherry, the leaves of the cherry-laurel, and the bark of the wild cherry.

Amygdalin, when obtained pure, is a white, odorless solid, with a taste both sweet and bitter. Taken alone, it is not poisonous, even in considerable quantities. But if mixed with a substance named emulsin, and wetted, amygdalin begins at once to break up, with formation of three other compounds as follows:

Amygdalin, 457 parts (by contact with emulsin), produces:	{	1. Bitter Almond Oil, 106 parts. 2. Hydrocyanic Acid (or "Prussic Acid"), 27 parts. 3. Glucose, 360 parts.
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In the plant, amygdalin is accompanied with the emulsin needful for its fermentation. During the ripening of the fruit, and in the maturity of the leaves and other parts, the amygdalin is constantly though slowly being transformed into the three products above named. The bitter almond oil and hydrocyanic acid are volatile and odorous and give the pleasant odor of peach kernels, almonds, etc., familiar to every one. The rapidity of the chemical change is chiefly governed by the proportion of moisture, being greatly accelerated by wetting the bruised kernels or leaves, and stopped altogether by drying, while the moisture of the living plant permits only a gradual rate of the transformation. One of the products of this change is poisonous, the well-known hydrocyanic acid, or prussic acid, one-tenth of a grain of which is a full medicinal dose. The bitter almond oil (known to chemists as benzoic aldehyde and easily oxidized to benzoic acid) is not in the least poisonous (when separated from the hydrocyanic acid). It will be seen from the numbers of parts resulting from the change (as given above), that one part of hydrocyanic acid, and four of bitter almond oil, are produced by sixteen parts of pure amygdalin. The amygdalin of the shops, in Europe, where it is somewhat used to generate hydrocyanic acid in medicine, yields from 1.20 to 1.25 of its weight of hydrocyanic acid. In exposure to the air, the hydrocyanic acid, being very volatile, is quickly dissipated, while the bitter almond oil vaporizes more slowly. In most fruits of the almond family, the amygdalin and its products are obtained chiefly or only from the kernel, hence the well-known flavoring effect of leaving in the stones, or a few cracked stones, in canned fruits. Some of these fruits, however, have the amygdalin deposited in the sarcocarp (or edible portion). This is stated to be the case with black cherries.

The almond flavor is a very grateful accompaniment of fruits and flowers, and it is provided by nature in safe and wholesome proportions, but it has been so tampered with by the art of man that its use is now beset with dangers of several sorts. In the first place, there is the danger in concentrating what the Creator has diluted. The oxygen of the air itself is poisonous when concentrated. Bungling art is almost sure to "overstep the modesty of nature" by

using good things in hurtful excess. The essential oil of bitter almonds extracted from cherry laurel leaves, or from bitter almond kernels, is liable to retain a poisonous proportion of the hydrocyanic acid, and its use in flavoring extracts, for pastry, etc., has now and then produced illness and even fatal results, more frequently with children. If made free from hydrocyanic acid, as the manufacturers should do, the essential oil is harmless in any quantity, and the essences, extracts, waters, etc., made from it can be used with entire safety. If long exposed to the air, the oil deposits a slight sediment of benzoic acid, which is harmless. The danger in the use of bitter almond oil from the amygdaline of plants lies in possible neglect of removing the hydrocyanic acid. Then, in the next place, there is another substance which has the same odor as bitter almond oil, viz.: a substance named *nitrobenzene* and sometimes designated "oil of mirbane," a body which is in itself very poisonous, either when taken into the stomach or inhaled into the lungs. It is a very cheap substitute for actual bitter almond oil, which it resembles only in the odor. It has been manufactured for twenty years, from coal tar, great quantities of it being used in making aniline dyes. It is from this article that many cheap grades of soap have been saturated with the smell of almond, of late years, quite to the discredit of the flavor. Unscrupulous manufacturers have used it in confectionery, and the danger of its substitution in culinary extracts besets the public, who cannot employ analysts for the examination of every manufactured article purchased for the kitchen. But if chemical art furnished a temptation for the improper substitution of nitrobenzene, it has lately compensated for it by discovering the manufacture of actual bitter almond oil itself, a pure article, at once real and artificial, and by means so cheap that they are likely to remove the temptation to use nitrobenzene. German samples of this new product were on exhibition at the Centennial last summer.

4. FLAVORING ETHERS. Many other odor-giving constituents, beside that of the almond, are subjects of chemical manufacture. For example, oil of wintergreen (found in the berry and other parts), is well known to be chiefly salicylate of methyl, readily prepared from salicylic acid and wood alcohol; and the oil or essence of pineapple is precisely butyric ether, manufactured largely from waste materials. Acetate of amyl, and valerate of amyl are supposed to represent the flavor of the apple and the pear, but how accurately they coincide with the actual flavor-substances of these fruits has not been demonstrated. Formate of ethyl, another compound ether, is used in so called peach-essence. Numerous *fruit flavors*, used for culinary extracts and largely for soda-fountain syrups, are manufactured as mixtures of ethers, by recipes varying with different manufacturers. Many of these, resting on no due authority, are unwholesome mixtures, often spurious imitations of the true fruit flavors, and again hurtful by reason of excessive proportions. As to the chemistry of the production of flavoring ethers in plants, some guesses were presented under the head of sugar fermentation.

5. ALKALOIDS. *Substances strongly affecting the nervous system*, as medicines or poisons, of course do not occur in the edible fruits, and we are not in the habit of placing potent compounds among the constituents of fruits as a class, nevertheless, when we think of it, no small proportion of the banes and antidotes of the vegetable kingdom is matured in seeds and their coverings. In the poppy fruit, the capsule or pericarp furnishes at least sixteen distinct alkaloids, including morphine, while the seeds are harmless and yield an oil much used for food. In the fruit of the nux vomica, the seeds are deadly with

strychnine and other poisonous alkaloids, while the juicy pulp is but very slightly impregnated with these bitter poisons (Flückiger and Hanbury, *Pharmacographia*, p. 384). The seeds of henbane, and stramonium, and the calabar bean contain potent alkaloids. The unripe tomato often contains traces of solanine, a poisonous alkaloid, which disappears during ripening, probably by a glucosic fermentation. The same alkaloid is sometimes found in the green or exposed parts of potato tubers.

Many of the vegetable alkaloids are stable compounds, having clearly marked chemical characteristics. Some of the opium alkaloids closely resemble others, in their composition. Different species of the same family often yield the same alkaloids. The theobromine of the chocolate nut can be changed by the chemist into caffeine, the alkaloid of the coffee berry. Such an insight has been obtained of the structure of conine, the alkaloid of the classic poison-hemlock, that it has been formed from inorganic materials, through the processes of the laboratory. But no evidence has been obtained as to the steps through which alkaloids are formed in the living plants.

It is little enough we know of the productive chemistry of plants. As, at the beginning, we had need to plead ignorance of plant constituents, still more, at the end of our brief survey, must we declare ignorance of the chemical genesis of those constituents. We can only obtain such glimpses of the progressive order of plant chemistry, and we have only such a distant view of chemical action itself, as can give us some hints of the order, and harmony, and grandeur of the molecular changes going on in ripening fruits before us. None the less for our ignorance, the forces each season complete their work and drop their bountiful products into our hands.

University of Michigan, July 31, 1877.

VALUE OF THE TRAINING GIVEN AT THE MICHIGAN AGRICULTURAL COLLEGE.

BY ALBERT N. PRENTISS, PROFESSOR OF HORTICULTURE IN CORNELL
UNIVERSITY.

[The following address was delivered before the Alumni of our Michigan Agricultural College at the last triennial meeting, and was kindly furnished by Prof. Prentiss at the request of our society for this volume.—SECRETARY.]

Fellow Alumni, Ladies and Gentlemen :

Our worthy President has called upon me for an oration, but I need hardly assure you that I shall make no effort in the direction of oratory. Oratorical gifts are rarer even than angel visits ; and for one to attempt an oration whose genius, if he have any, is not at all in that direction, is scarcely more promising than a song from him whose most conspicuous mians qualities are time and tune and melody. But after all, in this gathering, it is not so much an oration, if this were possible, that we desire, as to meet simply in social intercourse, to clasp the friendly hand, to renew the bonds of friendship, and to freshen those earlier memories which grow dearer as the years go by.

It is now fifteen years almost to a day since there went out from this institution the earliest of its graduating classes. We were few in number, only seven all told ; but this distinction was ours, to be first to receive from our *alma mater* such training, such a fitting for the duties and responsibilities of life as she could give in those earliest years of her history. And now as we are met in this triennial gathering, I know of no subject which seems more appropriate for a brief consideration, than an inquiry as to the value of the training, which we of the earlier classes received from the hands of this institution,—as proved by the experience of the years which have since passed away. It is true enough that we went forth in exceptional times ; Sumpter had just fallen, and the marshalling of armed men was seen in every village and hamlet throughout the land. Our first duty seemed plain enough—to enter the conflict and uphold the right (as we saw it), with such ability as we possessed. But sooner or later we returned to the ordinary affairs of life—all but two : these as we know gave up their lives amidst the tumult and carnage of the battle's front. And here we pause to weave once more a wreath of laurel and place it, with fragrant flowers and loving memories upon their honored graves.

The first three or four classes have now had a dozen years of experience in

which to test the value of the training which this College affords, or at least which it afforded to us. This question—of the value of that training—however, cannot be separated from that fundamental one as to “what knowledge is of greatest worth?” True, this question has been learnedly and exhaustively treated by many scientists and thinkers; but certain specific applications of even the most universally acknowledged principles are still left open to us.

1. A first requisite of an education it seems to me, is that it should be of practical utility, except perhaps in the case of the few who are, happily or otherwise, endowed with an abundance of this world's goods. To gain a livelihood is a first necessity; and one's education should be so shaped as to contribute to this end. There are those who contend, with a sincere honesty no doubt, that this is but a sordid view to take of so exalted a subject; that the sole purpose of an education should be the cultivation of the intellect, the development of the mind, and the advancement of knowledge for its own sake. But after all the mind does not exist independent of the body; and we know very well that as a rule mental conditions are the direct result of bodily conditions. Whether, therefore, it be a high or low view, we find that the point is already irrevocably fixed, that the wants of the body must take precedence to those of the mind.

A first question to decide in all cases, therefore, is whether or not this or that particular education would be likely to contribute to one's material success. This point, when once correctly decided, is an important advance towards the correct solution of the whole question; but unfortunately the solution is often one of great difficulty. And just here the turning point no doubt is closely connected with one's individual abilities—his natural endowments and tastes. It is an actual loss to the world and to the individual that some who might have been successful mechanics are occupying places in the ministry and the law, and other positions which they are by no means competent to fill. It is always sheer waste to spoil a good artisan for the sake of supplying a poor divine, and *vice versa*.

I suspect there is needed just here such a careful classification of facts with, perhaps, the making out of some new ones, as shall practically amount to a new science,—one that will enable the parent and the teacher to so guide the child and the youth, that all the efforts to be put forth in the gaining of an education shall be directed to his preparation for that exact position in life for which he is best fitted. But how many parents are there who are capable of giving sound advice in this connection? Still, an early decision is often indispensable,—it is often one that changes for better or worse a whole life's career, even as a pebble may sometimes change the course of a brooklet down the mountain side.

This new sort of science to which I have referred, but for which I have no name to suggest, would then, simply, have for its practical object the so directing and shaping of the education of the youth of the land, by both parent and teacher; that, developing into maturity, the right man might be found much more universally than at present, to fill the right place with credit and success. Especially should our new science enable the parent to study with discrimination and intelligence the idiosyncracies of the child from its earliest years: to watch the unfolding of its mind; to understand its inherent tastes and disposition: to note especially its physical peculiarities and requirements, and thus be able to so direct and control its course and habits as to favor its

development into a youth of the greatest possible physical, mental, and moral strength.

2. As between classical and scientific studies as features of the true education, it is not needful that we should dwell at any length upon their relative merits. In any case the choice between the two falls readily under the rule already laid down—that the decision should be based upon one's tastes, capacity, and purpose in life. It is desirable that every one should be encouraged to follow the bent of his own mind. As a rule the child develops very early in life an obvious taste and capacity for some particular line of study; and it were a misfortune that this capacity should not be recognized and made the most of. I happen to know a boy of eighteen, a real genius in his way, who has such facility for the mastery of language that he already reads and writes some twenty languages with remarkable correctness, and speaks a dozen of them with fluency. It would be a misfortune if for any reason this youth should be deprived of the opportunity of pursuing his linguistic studies; because their pursuit promises to be of great value to himself and to others in the increase of our store of philological learning. Another, caring little for language, is a close observer of nature and is inquisitive of her secrets. By observation and experiment he is always attempting the mastery of new truths. In his case also it were a pity he should not follow the bent of his own mind, the more than probable result of which will be to enlarge the domain of science.

As to the benefit which is to be derived in the way of mental discipline, I am unable to see any important difference between classical and scientific studies. In any case the mind is strengthened by that exercise of it which is required in the mastery of any fact; and of these facts there is a sufficiently inexhaustible supply in any branch of learning. As to the facts themselves, there may be some choice as to which are best worth the knowing. It may be well to go back to ancient times and become acquainted with the beliefs and superstitions, the thought and history of bygone nations, and even to make a mastery as far as possible of the language which served them as a vehicle of thought; but meantime we are compelled to remain oblivious of a world of truth which immediately surrounds us. Here is one among our common insects, for instance. Why may we not study its history, trace it through all its wonderful changes, observe its peculiarities of habit and structure, and thus acquaint ourselves with its whole life history from its first inception until it has completed the full office of its creation? But the study of this insect-life does not stop here; we will of necessity inquire into its relationship to other insects, to the higher animals, to the organic world as a whole; in short, we find it to be but a single link in that great chain of truth which is the obvious emanation of an all-pervading, creative power. On the one hand our study of ancient myths, not always chaste, or of superstitions too often whimsical, relate only to emanations from the human mind; while in the study of nature we are engaged in the mastery of that sort of truth, which relates to the purpose and plan of an intelligent creator. While, as I have stated, I am able to see but little difference between classical and scientific studies so far as their value for mental discipline is concerned, I should place the latter, especially natural history studies as of higher value, in this: that they have to do with facts which are in themselves more desirable of attainment.

I do not, however, think it would be desirable as a rule to exclude classical studies, or more particularly the ancient languages from one's education. And

I would guard especially against that sort of education which invariably produces one-sided men. While one's chief labor should be given to the particular branch of one's own choosing, he should by no means ignore those other branches of learning with which it is closely connected. As I look upon it, a college course should not be considered as affording one an education, but simply a foundation for it.

3. An important improvement in our educational methods would be the introduction of some systematic and efficient means for the promotion of esthetic culture. The world is full of beauty,—but it too often exists unseen. Few, comparatively, really know that there is such a thing as a sunset,—or at least possess any adequate conception or enjoyment of the wondrous beauty which this phenomenon so often presents. But nature teems with pictures as beautiful in their way as this. There are the hills and the mountains, and the valleys, the field and the forest, the lake, the river, and the sea; the varying seasons, the calm and the storm, the sky, and the stars, and life everywhere. To be able to appreciate all this so as to find real enjoyment of nature is a source of constant improvement, and is in every way desirable. Even we might claim for it some practical utility: for he whose mind and heart are such as to enable him to appreciate the beauties of nature leads a fuller life than he who knows not of their existence,—and it is always better to lead a full life than a half life.

Not long since I chanced to be taking a short excursion through one of the most charming regions I have ever beheld. The way led over a succession of hills with distant and near views constantly changing, but always beautiful. At a certain point, near a farm-house, there seemed to be the culmination of the beauty of the whole landscape for forty miles around. There were alternating pastures and meadows, woodlands and open fields, and orchards laden with the blossoms of early summer. Beyond this foreground was a succession of countless hills of varied outline, and of numerous valleys checkered with farms; a dozen miles away, shut in by softly molded hills, a crystal lake shimmered in the golden sunshine, while in the extreme distance outlying spurs of the Alleghanies gave grandeur and majesty to the scene. It was a picture which the eye may seldom look upon,—one that should fill the heart with joy and reverence, with inspiration even to look beyond it to the hand by which it had been created.

The farm-house in question, which was of ordinary appearance, had upon one side of it a covered verandah, on which the farmer no doubt sometimes rested from the labors of the day; but it was not placed upon that side, where it might easily have been, which commanded the view I have attempted to describe, but on the other, where the near view was a lean and unpicturesque wood-pile, flanked by a weedy yard, and shut in just beyond by rather ill-looking barns. Here was the owner of the farm living all his life it may be in the midst of scenery than which scarcely any could be more beautiful, and yet probably not knowing of its existence. How much better for him had he been able to look out upon this wondrous picture which the hand of the Lord had shaped, and gather satisfaction and improvement from it day by day.

What is needed is this, that the child should have its mind drawn to the sunset, the clouds, and the sky, and the thousand beauties which nature so abundantly supplies; with little difficulty he may be taught to observe and appreciate them; and this appreciation, as I believe, will strengthen with his growth until in his maturity it will be an invaluable source of enjoyment and

improvement of the mind and of the heart. It will be the sowing of the seed, which presently springs up, and in maturity bears an abundant fruitage.

The need for esthetic culture is but too obvious in any journey we may take in almost any section of the country. It is almost never that we meet with that degree of order and neatness of taste, and adaptation to local conditions which circumstances readily admit of without any increased expenditure of time and means. I am thoroughly convinced that no system of education will be complete which does not carefully provide for the efficient culture of the esthetic qualities of the mind.

4. Another point on which we can not too often or too strongly insist, is the need of careful and intelligent physical culture. As has been remarked, "the first requisite to success in life is to be a good animal;" and Herbert Spencer adds: "To be a nation of good animals is the first condition of national prosperity." No one fails to admire that harmony which exists between a sound mind and a sound body: indeed, it seems well nigh impossible for the one to exist without the other.

Untiring efforts, intelligently directed, should be put forth, until the methods for attaining the highest possible physical vigor and strength are understood and practiced by every youth in the land. No doubt this sort of culture should commence with the parent so that the offspring may be endowed with that constitutional vigor, without which perfect physical conditions are unattainable. And I suspect that in this connection some valuable lessons might be learned from the methods pursued in the rearing of choice breeds of domestic animals. Two or three years since I chanced to attend the show of the Highland Agricultural Society near Edinburg. It was a wonderful sight to witness the perfection to which the numerous breeds of animals had been brought, the symmetry of form, the sleekness of hide, the strength of muscle and of limb, and the beauty and docility of the eye, and above all the remarkable adaptation of each breed to the particular wants it was intended to supply. And after the prizes had been awarded it was a somewhat fanciful but rather impressive spectacle to see the prize animals gaily decorated with ribbons marching to the music of the band in grand procession through the avenues bordered with thousands of spectators. But it was difficult not to contrast the appearance of the people with that of the sleek and comfortable looking animals. Evidently a large proportion of the former had come out from factories and workshops, from mines and iron mills to enjoy a rare and infrequent holiday. They were too often pale and thin, wearing upon their countenances an expression of discontent, if not of want: it was only too obvious that there was too little of the sunshine and the field, and generous board for them, and too much of privation, and of the confinement of the workshop and the mine. If Scotland could only find means for giving to all her people that degree of physical culture which she gives so perfectly to her favorite breeds of domestic animals, she would set a noble example which every nation might well imitate.

In every correct system of physical culture I should not place either the gymnasium as ordinarily conducted, or contests of manly sports (so called), such as those which of late prevail at Saratoga, as of high value. While well enough in themselves, they are,—not to mention more objectionable features,—apt to prove absolutely injurious by overdoing that which if moderately pursued might be beneficial.

Among the various suitable means of physical culture, and also greatly favor-

ing esthetic culture, I would mention walking as being of highest importance. As a nation we have well nigh lost the art of walking; we must either ride or stay at home; the possibility of walking seems rarely to enter the American mind. At the present moment I can recall only two, Thoreau and John Burroughs, who among us have in late times, fairly mastered this most desirable accomplishment.

"I do not think I exaggerate," says John Burroughs, "the importance or the charm of pedestrianism, or our need as a people to cultivate the art. I think it would tend to soften the national manners, to teach us the meaning of leisure, to acquaint us with the charms of the open air, to strengthen and foster the tie between the race and the land. No one else looks out upon the world so kindly and charitably as the pedestrian; no one else gives and takes so much from the country he passes through. * * * Man takes root at his feet, and at best is no more than a potted plant in his house or his carriage, till he has established communication with the soil by the loving and magnetic touch of his soles to it; then the tie of association is born; then spring those invisible fibers and rootlets through which character comes to smack of the soil, and which makes a man kindred to the spot of earth he inhabits."

If earnest and energetic societies for the cultivation of the art of walking could be everywhere established, or perhaps still better, if departments of physical culture,—in which instruction in this art should be a leading feature,—could be added to every institution of learning in the country, no one can doubt that great good would result from it to the individual and to the nation.

I know that it will be objected that mechanics, or more particularly farmers, are already so over-burdened with labor that walking for recreation would be wholly out of the question. At certain seasons of the year this may be true, but on the other hand this is also true, that farmers, as a class, work more than is needful or profitable. If they would only give more thought and system to their profession, they might with absolute profit command a greatly increased amount of leisure. Upon this point very much might be said, but I will refrain from enlarging upon it here.

It is not needful, however, that we should even attempt to consider all the characteristics which go to make up a true education, either in its broad sense, which relates to a life's achievements, or in the more restricted sense which relates simply to a course of instruction in the university or the college. I have glanced at a few points which seem worthy of consideration; but many others would require discussion were we attempting fully to answer that important question as to "what knowledge is of greatest worth." Our educational system is not, to my mind, perfect at any point from the primary school to the post graduate courses of our best universities. While on the whole we may well regard it as creditable and praiseworthy, there are, nevertheless, many defects to be overcome and improvements to be introduced.

If now we were to test the course of instruction in this Institution as given to its earlier classes as one of the elements of what we regard as the true education, we find among some things to regret very much which warrants hearty commendation. In the first place this Institution was among the first, if not the first in the land to so shape its instruction as that it might have a distinctive bearing upon the practical affairs of life. The sciences were pursued not solely for their own sake, but also that a knowledge might be obtained of their utility with reference to practical arts and industries. The old notion that science ceased to be science when it sought to reach useful ends, was discarded.

And there is no better evidence that our notions of what a true education should be are greatly improved, than that learned scientists, who formerly maintained that theory as to science which this college discarded, have since abandoned it as untenable. If science can be made practical, so much the better for its own sake, because financial prosperity and thrift are indispensable to satisfactory scientific and educational progress. The change of feeling in this regard is further shown in the establishment of numerous technical schools of various sorts since this Institution was founded; and also in this that all the great Universities in the land now maintain highly creditable schools of science of a more or less practical character, while almost all the old classical colleges have introduced scientific courses,—often feeble enough, but still showing the educational tendencies and demands of the times.

The great importance of technical education I think has not been overestimated, or indeed as yet fully appreciated. It is difficult to conceive that any amount of increase of classical learning would advance the material prosperity of the nation; whereas an increase of a knowledge of sciences in their practical aspects, through which the forces and products of nature are better understood and more thoroughly utilized, would obviously tend to promote such prosperity. A knowledge of the odes of Horace, or the epics of Homer, however excellent in itself, will not invent the telegraph or build railroads, or construct improved machinery, or lead the way to a more profitable husbandry.

Another feature of this institution was one which tended to promote the physical culture of its students. Its manual labor system, defective in some respects, served as I think a good purpose in various ways. As a whole the students seemed more robust than those of other institutions, and on the completion of the course of study went forth with more vigorous constitutions than is usually the rule. I do not, however, believe that any system of manual labor can be so devised as to become the exclusive means of the highest physical culture.

With a somewhat extended opportunity for observation, I am convinced that the course of instruction of this institution, has no superior in regard to its general adaptation to the wants of earnest, practical, working men. I know of no profession or occupation for which a man would not be the better fitted for having pursued it. It teaches the student observation and self-reliance; it acquaints him with a wide range of sciences, a knowledge of which is valuable in itself, but also valuable in its bearing upon agriculture, the great source of our national wealth and prosperity, regarding which no citizen, who is at the same time the sovereign, should be ignorant; and especially the course gives him a broad and unexcelled foundation on which to build by subsequent personal effort.

But I need not in detail consider the peculiar features of this Institution in her earliest or later years. That she was perfect then, or is perfect now, no one will claim. Human inventions, and achievements, and institutions, if they are to possess any marked degree of worth, do not at once spring up into perfection. Defects will be developed, which must be remedied; improvements will be demanded, which must be introduced. Those of us who have been away from the College for a number of years, find now on our return pleasing evidences of a prosperous and healthy growth, showing unmistakably that she is rapidly attaining that high position which her friends have been accustomed to keep in view. That this and similar institutions are to take the place of the older ones modeled on a different plan, no one will claim; but that being called

upon to fill a position which is demanded by the needs of the true education in its broadest sense, she is proving herself capable of filling it with credit and honor.

To sum up briefly my own sentiments, and as I believe, the sentiments of my associates of the alumni, I have only this to say, that all in all, we look upon our *alma mater*,—in the past, with satisfaction for what she was; in the present, with an honest pride for what she is,—and as to the future, with high hope and expectation for what she is to be.

TRANSPLANTATION FOR THE FARM, THE ORCHARD, AND THE GARDEN.

BY CHARLES W. GARFIELD.

SCIENTIFIC VS. PRACTICAL KNOWLEDGE.

The practical man is often ready with the announcement that he cares nothing for science applied to agriculture; it is enough for him to know that certain methods produce certain results: farming is a means of getting a living, and knowing how to get a livelihood honestly in the legitimate prosecution of agriculture, is the sum of all that goes to make successful farming. This statement was made to me a few days ago by a thrifty stock grower in Iowa, but before we had completed a few moment's conversation, he said: "I have studied a good deal over the matter of the influence of forest growth upon the climate of a country, and believe that the temperature and rainfall of our State will be more even throughout the year, when the immense plantations of forestry already planted out on our prairies have attained considerable size. Do you know what our most knowing men have brought out in this matter?" It was in my heart to reply that the most knowing men who had looked up this matter were scientific men, and he of course would care nothing for their opinion. I denied myself, however, and answered his question as well as my stock of information would allow.

The actions of our so-called practical men everywhere speak more truthfully than their words. The results of scientific research are everywhere in use, and notwithstanding all protests, the tendency of the severest of practical men is toward the "because" of things. Our people are a questioning people, and are continually looking for bottom facts, for principles that underlie methods of practice. It is only with this peering into the why of results that men grasp the elements of success, and with their aid swing themselves into prosperity.

This I have said as introductory to my subject, because in treating it I shall link together the science and practice of the matter, mingling the reasons with the methods and still try to have it all practical.

BEGINNING AT THE ROOT.

In starting out we will begin with the foundation—striking at the "root" of the subject at once. In dealing with plants, as with men, we must understand their nature or we shall make grave errors, and reap the reward of ignorance. If we take a seedling tree at one year old, we find the root, like the top,

is principally trunk; if we wash it from the ground with some care so as to preserve its entire growth, we shall find this main axis of root and top has been fed by a large number of small roots threading away from it, each one containing at its extremity an active mouth. Now if this plant had been pulled from the ground a large majority of these feeders would be broken off, and the plant if set out again, must, as a first matter of business, heal its wounds and make some more mouths. If the plant we washed out were set out with care, or if the little roots had been preserved by removing a quantity of earth along with it, the time spent in doctoring and putting out new arms would be all saved. Take as a second example a tree at two years of age; let it be, for instance, a chestnut, which tends to grow a tap root of great length. By washing out with some care, we find again that the root has grown proportionally with the top, and that a single leader extends into the ground about as far from the surface as the terminal bud of the leading shoot stands above the ground; and, further than this, we find the root hairs quite equally distributed over the length of this root axis, gathering nourishment from a depth of eighteen inches or two feet. Now, if this plant were taken up as trees are ordinarily, one-half or more of the entire root system would be sacrificed. Is it any wonder that so large a proportion of transplanted trees do not survive the process?

But all trees do not have tap roots that extend so deeply into the soil. Take a soft maple, as a second example; at two years of age under good culture the stem above ground will be three or four feet in height; if the root system be lifted entirely from the ground it will be found to extend over an area of twelve square feet, the roots branching in every direction. Now, as the trees of this growth are ordinarily taken up, about one-third of this surface is disturbed, and two-thirds of the entire root system remains in the ground, and should you examine with care, the active mouths of the tree would be found almost entirely left in the soil.

As the tree gets older these roots near the body become larger and almost wholly destitute of fibrous working roots, and the feeders are far away from the trunk, continually seeking fresh pasturage. So that as the tree becomes older a smaller proportion of active roots come up with it when the tree is transplanted. The result is that the percentage of failures in transplanting large trees is much greater than in removing small ones.

ELISION OF ROOTS PRODUCES EXHAUSTION.

The immediate effect of elision of a large portion of the roots of a tree when the tree is dormant is not a shock to the tree, but the healing of the wounds is a draft upon the reserve vitality of the plant. When there are many sections to heal the exhaustion in forming the granules over the fresh surfaces may be so great that if there are no fibrous roots left to begin work there is not sufficient vitality in the tree to start out a new set of feeders, and the tree dies of starvation. If the tree be removed while in full vigor of growth, and in so doing the roots be curtailed, the result is liable to be immediately disastrous. The tree then experiences a double shock, that of the loss of feeders and that of removal to new conditions. The leaves go on giving out moisture as rapidly as ever, and soon the supply on hand gives out, the leaves become sear and the tree dies of thirst.

To understand this we must know that the sap going up the tree is pretty thin, having in solution very little that nourishes the plant; it goes up into the leaves, whence the water is mostly given off and the food is left for the leaves

to fix up in shape for growth. If a tree could be moved with every fiber and root hair there would be as little danger of removal in summer as during its dormant condition; but it is impossible to remove a tree of any size without parting with a large portion of the roots, and the want of water is immediately felt with the tree in full leaf.

TIME FOR TRANSPLANTING.

The question then arises, when is the best time for general transplanting of orchard and ornamental trees?

A prominent member of the State Pomological Society four years ago, after giving his experience of one year, recommended unqualifiedly the month of June. He had ordered a large supply of trees and shrubs, which by some accident were delayed on the road from the East and arrived very late—about June 10th. Almost the whole lot were in leaf and many plants in bloom. He planted them out in the night, and a rainy one at that. Everything grew, hence the conclusion that the time for successful removal of trees is in June when in leaf. This was altogether too hasty a generalization. The trees had been packed in very wet moss, and under the influence of the warm days had thrown out roots into the moss, absorbed lots of moisture and leaved out. The plants were in a fine growing condition, with every part in working order, and having enough water to drink, had not as yet felt the want of food, except that which they could get from the air. They were put into the ground under the most propitious circumstances, with everything ready to go at work making a living. Not so with a tree dug up and transplanted in the same season, for its working fibres would be sacrificed, and the tree would die before it could establish itself in the new conditions. If trees are to be planted out in fall or spring, there are many things to be taken into account before deciding which of the seasons to choose. In a climate where the ground freezes very little, and the spring time begins with the earth and air about the same period, it is safe, generally, to plant in the fall, while in a country where the frost penetrates to a considerable depth the practice would be questionable, because the warm air would stimulate the buds into action before the condition of the roots would warrant it. Another consideration with fruit trees is to be looked after. If the trees are purchased in a milder climate than that in which they are to stand, the probability is that the nurseryman will strip off the leaves before they are fully ripened so as to forward them in season. The result will be that the trees, not having fully completed their ripening process, will be in the poorest possible condition to withstand the exposure of a severe winter. It is said often that if trees are put in the autumn they become thoroughly established, ready for work as soon as spring opens. This may be so, but the risk of their dying while getting established is one to be thought of in making a decision. I would in case of the transplantation of nursery stock into the orchard always, if possible, have the trees either heeled in, or, at least, root-pruned in the fall, so as to get the cut surfaces to granulating preparatory to shooting out feeders in the spring. This is quite a point gained. If the trees can be planted out where they will be well protected, there is little danger of putting out in the fall, aside from the unequal starting of root and branch in the spring. But the experience of our severe winters has taught us that there is no safety for trees lacking in vitality outside of a cellar or a snowbank.

To sum up the matter in a word of recommendation, I will say, plant young trees with as good fibrous roots as possible, and plant them generally in the spring.

EXTRA SIZED TREES.

Tree dealers have made a great deal of money at the expense of the planter, by selling extra-sized trees. Nurserymen are glad to get rid of them at almost any price, and dealers represent that the trees, if large, will bear in a year or two, and with this statement, and promissory condition, put on a good price for extra large trees, and sell them and the man who buys at the same time, for all such stock rarely survives, with any promise, the first season. The question turning upon how old, I should advise no one, ordinarily, to plant out orchard trees above two years old. In the first place the fibrous roots are better preserved, being near the body; and in the second place, there is less chance for fraud. Nurserymen are generally as sharp as other people, and if they find they are going to be compelled to hold over a block of trees beyond the ordinary ages called for, they proceed to root-prune the block, and thus check its growth for a season, and the trees are used up to fill orders of trees within certain limits of size—say from five to six feet in height. These trees are the better for root-pruning, but are not as good as others of less age in full vigor.

ROOT PRUNING.

I would not, however, exclaim against the process of root-pruning trees in preparation for transplanting. It may be employed with great advantage in many instances. For instance, in the example of the chestnut, which is a type of most of the nut-bearing trees. The first thing the plant proceeds to do in its growth is to shoot down into the earth a tap root; if this be cut off at the end of the first year, or second, say seven inches below the surface, the plant will throw out from the section made a mass of fibrous roots which can all be preserved in planting out the following season, thus diminishing the chances of failure that would accompany the process of transplanting without the previous elision of the tap root.

Again, in instances of trees that tend to form large main roots and few fibrous ones near the tree, the safety of removal is largely increased by cutting some of the main roots off the year before the removal, thus stimulating the formation of feeders close to the tree that may be taken up with it.

In the removal of large trees the elision of the main roots the year before transplanting is a necessary accompaniment of success, thus making the removal the work of a year, and transplanting by degrees.

PRESERVING THE BALANCE OF ROOT AND BRANCH.

In moving trees we have already seen that a major portion of the root must be sacrificed, even under the most careful management; the question arises, shall we make the proportionate elision of the part above the ground? A recent writer upon horticultural topics in one of our State papers said: "It is perfectly absurd to remove half the top of a young tree because the same fraction of the root system has been removed; it would be just as wise to say that because a man's toe has been cut off the body must be evened up by clipping off his ear." This may be a striking analogy, but carries no weight with it whatever. There is a certain balance to be preserved between root and top, and nature strives to keep this perfect; if we can aid her, we do well. For example, an orchard in very rich ground tends to make a very strong growth of root, and keeping along with it the shoots from the top grow so vigorously that they are cellular, brittle, and unripe. To check this the skillful orchardist does not mow off the top of his trees, but checks the root growth by an abstraction of moisture from

the soil, through a growth of some succulent verdure, like rye, oats, buckwheat, or millet. With the check of roots comes the corresponding slower growth of shoots, and time is given for filling up and ripening the wood in preparation for winter. If nature, then, deems it proper to maintain this balance of root and branch, we do well to follow her example, and when the roots are curtailed make a corresponding diminution in the top.

If trees are of considerable size the shape of the top may be carefully modified by a skillful use of the knife, while regarding the position of the buds. If it is desirable to make a spreading tree, allow the buds that are to make the main shoot to point outward, or, if a compact head be desirable, use the reverse process.

IS TRANSPLANTING LOSS OR GAIN?

One word about the desirability of transplanting at all and I shall take you to individual examples.

It is argued by many that transplanting is a process that should be avoided as far as possible, because it is a losing process. In the sense that growth is checked and modified this is a fact; but when we come to see the advantages over a plan of growing every plant from seed or cutting when it is to stand for life they are unanswerable. The cultivation of a large acreage with no especial return is avoided. The work is more compact. Checking of sap is desirable to secure stockiness, and it is better done by transplanting or root pruning in place: the soil for a vigorous start is more under control; the danger of loss from accident is very much less, and winter protection for young plants is more easily and successfully secured.

Every gardener of experience knows the value of transplanting his cabbages, tomatoes, celery, etc., in his hot-beds several times before planting in their final positions. His principal reason in each instance is to gain time and space. The tiny plants may be sown very thickly in a hot-bed, and were they to remain in the same position for some time the growth would be spindling and unshapely; while if transplanted as rapidly as they require more room, the plants become stocky, well shaped, and have nothing to overcome when put carefully in place.

MOVING GARDEN PLANTS.

While just here, I will give my method of setting out cabbages, tomatoes, lettuce, etc., into the garden. I do not wait for rain, or even a cloudy time, but when ready fit my ground well and have my plants in boxes of convenient size to carry. The earth and roots are thoroughly wet and cut into squares, so as to take out with each plant, all the earth that belongs to it. The holes for the plants are dug with trowel and hoe, and if the earth is dry a little water is put in each hole; the plant is next put in place and well packed in with dry dirt at the surface to avoid any baking, then a little piece of newspaper put over it, held down by earth. I have transplanted many thousand plants in the middle of hot June days in this manner with good success.

In the transplantation of strawberries and raspberries there are some matters of detail that require special attention. In our climate if either are planted in the fall they require a good deal of careful attention in mulching and protection for winter. I have had the best success in planting strawberries in the spring, allowing them to make no fruit the first season, and no runners until there was a good development of crown in the plants, pinching them off at regular intervals.

HENDERSON'S PLAN OF GROWING STRAWBERRY PLANTS.

Peter Henderson, the author of "Gardening for Profit," recommends the following course for obtaining strawberries the first season in abundance :

As soon as the crop is removed from a bed he fixes it in the best possible condition to make new plants, and as soon as the runners so develop as to show indications of rooting he places under the point of rooting, buried in the ground and supplied with good soil, a small sized flower pot. A small stone is placed on the runner which holds it in place, indicates where the pot is, and also tends to hold the moisture about the new plant. As soon as the plants in the pots are rooted nicely they are turned out of the pot and placed in their permanent quarters, when the land is in good tilth and of proper richness to push the plants as rapidly as possible. By this plan the crowns are developed well in the fall, and the first season gives a full supply of berries and also plants for a repetition of the same process, it being more profitable to make a new bed than allow this one to fruit the second year.

PREPARATION OF SOIL.

In planting out raspberries or strawberries the manner of handling each plant has a great deal to do with its prosperity. At the point of planting, a hole should be dug, and in the middle of it should be made a mound upon which the roots of the plant are spread out so as to come in contact with as much earth as possible. Perhaps I may say once for all, whether the soil is prepared for cabbages, strawberries, raspberries, apples, or cherries, it should be thoroughly stirred up and loosened to a depth of not less than a foot, and several inches added to this could be profitably worked. No one can successfully transplant trees of any kind without giving careful attention to the taking up of the trees, and using, at the same time, rare good sense.

PLANTING OUT FRUIT TREES.

As fruit trees come to us from the nursery in a majority of cases they are in a hopeless condition because of the careless manner in which their first removal was conducted. A tree must be dug, not pulled up, if it is to be given any chance for life. The more common method is to have two men dig and one pull, the digging only to be carried on to a point where a strong man exerting his whole strength can jerk the tree out ; thus the roots come up torn and mutilated, in a condition to die immediately, or support a sickly life for a time, becoming a prey to insects, and finally dying without giving any return to the purchaser. To be sure, it is a great deal better to remove with the tree some earth, but in case of transportation some distance this can not be expected ; but we may justly demand that our trees have good, unbroken roots. My preference would be to plant all fruit trees in the spring, and their age should be not more than two years for a double reason. I should have a better root system, and in pruning the top I could then trim it to a whip and form my top according to my own notion. The whole appearance of the future developed tree is largely modified by the first few branches, and these it is especially desirable we should control to suit our own ideas.

It is a very common practice to perform an operation upon newly dug trees called puddling. A puddle of clay is made and the roots dipped therein and covered with a thin film of the mortar, for the purpose of preventing evaporation and shriveling of the tree. Where trees have been abused fearfully and the roots have a good many fresh surfaces and unsightly gashes, this is a good

method to pursue, but in case there is a good supply of fibrous roots it is without doubt a positive injury.

After getting good trees, and having well-prepared land, the next question arises, How to plant them? Many men have had wonderful success the first season, in case of a severe drouth, by planting quite deeply, but this in the end is an injury, and the protection from drouth should be accomplished in other ways. As a general rule, trees should stand in the orchard about the same depth as in the nursery. It is often advised to dig very large holes for trees. This is all folly, provided the soil over the field is well fitted, and a hole just large enough to set the roots in so that they shall be straight, is large enough. In the planting of trees there is a good deal in the choice of a day—they cannot be protected like cabbages. If a moist day can be chosen so that no water need be used, there is a great saving of time, and success will be more sure. It pays to plant well, and if a day cannot be had just suited to the work, the following plan should be observed: Keep the roots from the light and air continuously. In setting the tree get the earth well packed about the roots and moisten it as it goes in, being careful not to run the dirt away from the roots with a stream of water. When the hole is filled nearly to the level, place about the tree some moist mulch that shall extend farther than the roots and cover the mulch with a slight layer of earth. I have often given this advice, and good results invariable come from it.

Orchards in our country, as a rule, lean in the direction opposite the prevailing strong winds. This must be met in the outset by planting the small trees so they shall lean toward the wind considerably.

TRANSPLANTING EVERGREENS.

It is generally supposed that evergreens are made after a different mold from deciduous trees and in their management require a peculiar tact that few possess. I am satisfied that this is not the case, but that any one who knows how to succeed in planting an apple tree can have equal success in the transplantation of evergreens. But a man who knows nothing of the removal of trees may make an apple tree grow, while he is pretty sure to lose an evergreen.

The truth is, evergreens are like other trees only a little more tender, and the roots cannot bear the light without injury.

One man of my acquaintance has been setting out choice evergreens upon his lawn for fifteen years and has but one now; another went to the woods, and, in a slipshod manner, in the middle of summer, removed a lot of pines, which are as difficult to make live as any, and every one lived, and now they form a beautiful grove of large, handsome trees.

Now the month of July is the last month I should choose of the twelve to transplant a pine; but this man chose a rainy day, and did the work almost in the dark, proving by his success that more depends upon the moisture and darkness than on the time of planting out. To insure success with evergreens, I should, beyond the usual precautions of getting good roots and planting in a well pulverized soil, see that the roots never knew the light for a minute; then if the mulching be attended to in the proper manner, there will be little percentage of loss. As to the best time in the year for planting evergreens, it seems to me there is little choice between the month of May and the month of August. I would not advise, as many do, that the trees be moved after the buds swell and growth begins, but transplant when the growth of the tree is at

its minimum. In August, with most evergreens, there is a rest in their growth. Evergreens, like other trees, require some cutting back if their roots are injured or curtailed, but inasmuch as evaporation is very much less in these than in the broad-leaved trees, the necessity does not become so apparent. In the case of our less hardy evergreens one precaution should be taken for a time: Both in summer and winter they should have a screen so set as to protect from the direct rays of the sun and to break the force of the wind. The severity of our winters and the extreme heat of our midsummer sun render this measure of safety advisable.

WINTER TRANSPLANTATION.

The matter of winter transplanting demands a little of our attention. Only the other day I saw a little of it practiced. Several pines, of perhaps twelve feet in height, were removed from the edge of a swamp where, as yet, there had been no frost, and placed in a light, sandy soil in front of a new house. The holes were dug out of frozen earth and packed back again as well as possible, but poorly done at that. The proprietor had evidently heard that evergreens of considerable size could be removed in winter, and expects to have a fine display of large trees next season. He is sadly mistaken; every one will die. This is not a model way of winter transplanting.

The object of removing trees in winter is to carry with the tree a large ball of earth so that a good proportion of the feeding roots may be carried along without mutilation, that they may in the coming spring be ready to support the tree during its time of trial. The taking of a tree from a soil where it scarcely ever freezes and placing it where it will have to endure the hardships of the very severest weather, is sure death to it, and the change could not be made at a worse season. Very large trees are often moved in winter, provided they have been well root-pruned the previous season, and made to grow quite thriftily by judicious shortening of the top.

WHERE TO GET TREES.

A question of considerable importance comes up in connection with the transplanting of trees, to-wit: Where shall we get our trees to put out? A great proportion of our trees for orchard and ornament come from abroad. I believe this should not be so. Michigan should raise her own trees, because it is a settled fact that there is great danger in the removal of plants from one climate to another, and any small change must in some degree be injurious. Trees grown in our own State are best fitted to grow continuously in our climate. In their growth from infancy to puberty they become modified to withstand the sudden changes of our seasons, and will live longer and do better than foreign stock.

I am a strong believer in a thorough division of labor, and sometimes advocate specialties in agriculture and horticulture, but for all that I wish a majority of our farmers would do something in the nursery business. It is the knowledge received in this primary department of orcharding that is needed to insure greater success in fruit growing. And especially would I recommend to every man who wishes to plant ornamental evergreens upon his place to purchase very small trees and grow them as near as convenient to the place where they are to be planted. A large percentage of the loss from removal would be saved. A great pleasure may be derived from the growing and shaping of their forms, and there is in this method a great saving of money where any quantity of trees is to be used.

SUCCESS DEPENDS UPON WHAT?

To succeed, then, in the transplanting of trees of all sorts requires four prominent acquisitions, viz.: knowledge, caution, tact, and industry—that knowledge which shall compass the habits of trees, their manner of growth, the effect of certain processes upon them, like pruning root and branch, removal from one soil to another, etc.; that caution which shall look well to trees and seasons, shall avoid all unnecessary delays, and which shall avoid all carelessness in the handling of the trees and plants; that tact which shall always make the most of circumstances, and suggest methods that may take the place of others found impracticable; that industry which is the main-spring of willing labor which hastens first to do, then to do well what is done. I have often heard of the “elixir that gardeners use” to bring their plants out of hard places and push them ahead, and believe there is such a thing, but its principal ingredient is untiring, interested labor.

POMOLOGY AT THE STATE FAIR OF 1877.

CHARACTER OF THE EXHIBIT—RESULTS OF THE DISPLAY.

From May until September the people interested in the success of that worthy old organization, the Michigan State Agricultural Society, were outspoken in the prophecy that the Pomological exhibit of 1877 would show Michigan fruit interests at ebb-tide. The State papers were continuously publishing items from the various sections, stating that the apple crop was either very light or nothing at all. Even the most sanguine of us, who believed that if there was any fruit at all the friends of the State Pomological Society would bring it out for the credit of the Society, began to lose heart as the multitude of answers came in telling the same sorry tale of "no apples." But the grievous intelligence only awakened a thorough desperation among a few to work, and the result of the severe exertion was seen in Pomological Hall, where were exhibited nearly five hundred more entries than ever before in the annals of the Michigan Pomological Society. That work paid. It showed the latent energy of the fruit growers of Michigan, which could be aroused in an emergency, and exhibit itself in a manner to be seen and felt.

Everywhere in the accounts of fairs this season, we see their uniform statement that "the entries in the fruit department are light," and when we place along with this the statement that our fruit entries are largely increased, it speaks volumes for the working force that lies at the foundation of our Society.

In the display of fruits, peaches, plums, grapes and pears were exhibited in large variety, while the quality was excellent. There was the usual number of entries of apples; but on account of the general scarcity, the beauty of specimens could not equal the years of plenty. That sworn enemy of the apple, the codling moth has been as busily at work as in plenteous years, and the result is a large proportion of the specimens made up the habitation of this insect. But even with the adverse circumstances, this "off year" for apples has been abundantly represented, and the apple exhibit of our State Fair would have been a credit to any State in any year.

In canned and pickled fruits and jellies there was a beautiful display, and with a good light it would have been the most handsome department of the hall. The interest taken in this department by M. W. Clark, of Parma, and L. C. Lincoln, of Greenville, assisted largely in making it so unusually successful. The uniform satisfaction given in the fruit premiums this year is due to

the careful and judicious selection of committees by the superintendent, Mr. N. Chilson, of Battle Creek; to this he gave special attention, and the admirable committee work accomplished must have been to him a most satisfactory result.

In the department of flowers, Mr. E. F. Guild officiated as superintendent to the satisfaction of everybody. The difficulty with which this is accomplished when dealing with so sensitive people as our professional and amateur florists can only be appreciated by those intimately connected with the work. Through it all Mr. Guild maintained his ever pleasant temper, and all who had to deal with him went away with the feeling that a perfect gentleman was in charge.

To Mr. W. R. Hibbard, of Jackson, and C. Van Haaften, of Kalamazoo, belongs the credit of making the principal portion of the professional display. Mrs. Dr. Andrews fitted up in her exquisite way, a lovely little sanctum, surrounded and filled in and begirt with the treasures of her greenhouse. None but a woman of the best taste could so deftly combine form and color in a display of plants and flowers.

The leading amateur exhibits were made by Mrs. W. K. Gibson and Miss D. L. Field. To each belongs a large amount of credit for the labor they gave in making two beautiful places in the center of our hall, and to each was awarded a goodly number of valuable premiums.

In cut flowers, H. Dale Adams, of Galesburg, and Mrs. R. M. Cook, of Charlotte, made extensive displays, and in small lots a large number took a part in the general exhibit to their own credit and the satisfaction of the society.

Too much cannot be said in praise of the general superintendent of Pomological Hall, Mr. Henry G. Reynolds, of Traverse, who was at work for nearly two weeks in planning for, and carrying on the exhibition. He was an indefatigable worker, and through his energy, firmness and executive ability we were enabled to segregate the various divisions so that the committee work was rendered comparatively easy.

I cannot close this general notice without speaking of the efficient manner in which several committeemen did their duties. Mr. Eli Bidleman, Mr. Emmons Buel, Mr. Wm. Rowe, Mr. A. J. Gould, Mr. James Satterlee, Mr. George Taylor, and several ladies, among whom we mention Mrs. Austin Blair, Mrs. Tunichiff, and Mrs. A. J. Gould, were earnest, careful, willing workers, only desiring to do justice to all. One of the severest pieces of committee work was done by C. N. Merriman, W. J. Beal, and Richard W. Judd, on the individual plates of apples. We may all feel gratified in having men so expert give their time and attention in so benevolent a manner. In every way was the pomological division of the fair a success, and a credit to ourselves and the State Agricultural Society, who so generously aid in stimulating the exhibition of the products of one of the leading industries of our State in so beautiful and successful a manner.

Grand Rapids, October 15, 1877.

NOTES ON THE REGISTER OF ENTRIES.

In division A there were sixty-eight entries spread well over the State, representing eleven or twelve counties.

In division B nineteen entries were registered: eight county collections of apples, three of peaches three of pears, three of grapes, and two of plums.

There were in division C, township collections, twenty-one entries, distributed as follows:

Nine entries of the collections of apples. Six entries of the collections of peaches. Three entries of collections of pears. One entry of collection of grapes. Two entries of collections of plums.

Division D, collections of fruit grown by exhibitor, was represented by four entries: Reynolds, Lewis & Co., I. E. Ilgenfritz, C. A. Sessions, and David Geddes.

Division E, apples, is always represented by a large number of entries, and this season was no exception. We give the number on the leading varieties:

Maiden's Blush—nine entries; Lowell or Greasy Pippin—five entries; Twenty Onnee—twelve entries; Chenango Strawberry—four entries; Jersey Sweet—eight entries; Fall Pippin—fourteen entries; Peek's Pleasant—five entries; Rhode Island Greening—twenty-one entries; Baldwin—fourteen entries; Red Canada—seven entries; Golden Russet—thirteen entries; Roxbury Russet—fourteen entries; Wagener—nine entries; Northern Spy—eighteen entries; Belmont—six entries; Fameuse—thirteen entries; Tompkin's County King—ten entries; Yellow Bellflower—nine entries; Talman's Sweet—twelve entries; Esopus Spitzenberg—twelve entries.

In division F, pears, the leading lists of entries were of Bartlett's 10 entries; Buffam, 6; Flemish Beauty, 16; Seekel, 11; White Doyenné, 9; and Winter Nelis, 5.

In peaches, division G, the entries were confined to fifteen varieties, of which Crawford's Late took the lead.

There were entries made in division H, grapes, in every class but Catawba, and of Concord and Delawares there were long lists of twenty or more in each class.

The plums, division J, nearly all came from Manistee, Mason, and Oceana counties, and although there were long lists of them, and the plates showed well, there were not a great many sorts represented.

In division K, dried fruits, nearly all the classes were filled, and the entries numbered 35.

In canned and pickled fruits, division L, the entries numbered nearly 150, and every class had a long list of them, besides there were a number of new classes made for the occasion.

In the next division, preserved fruits and jellies, the entries numbered about as many, and of jellies there seemed no end.

In division P, professional plant list, the entries were well scattered over the designated classes, and there were also over one hundred entries made of plants that were not classified. These entries were made almost entirely by C. Van Haften of Kalamazoo, and Wm. R. Hibbard of Jackson, thus exhibiting a commendable zeal on the part of these men, who were willing to make fine exhibits even regardless of premiums.

In the amateur plant list, division Q, there were not so many entries, but the plants were choice ones, and in some cases where persons had grown but a very few plants, and entered one or two only, the plants placed in exhibition were very fine.

In divisions R and S the entries filled all the allotted space and outnumbered the usual entry list, but were not as well scattered through the classes as they should have been to have drawn all the premium money.

The entire register of entries numbered about fifteen hundred, and after the time of closing there were over a hundred that came too late for putting on the books.

LIST OF PREMIUMS AWARDED BY THE MICHIGAN STATE POMOLOGICAL SOCIETY AT THE STATE FAIR HELD AT JACKSON,
SEPTEMBER 17-21, 1877.

DIVISION A—ORCHARDS AND VINEYARDS.

[In this class it seems best to give the entire list of entries as reported by the committee. A full account of the work done in connection with the awarding of premiums is given in the report of the annual meeting which follows later in this volume.—*Sec'y.*]

The following is a full list of all the entries made for the year 1877 on the books of the State Pomological Society in division A, namely, orchards, vineyards, and gardens. The figure refers to the number of entry; next is given its character; third by whom entered, and fourth his postoffice address:

1. Vineyard—J. G. Ramsdell, Traverse City.
2. Young Peach Orchard—J. G. Ramsdell, Traverse City.
3. Plum Orchard—J. G. Ramsdell, Traverse City.
4. Young Pear Orchard—J. G. Ramsdell, Traverse City.
5. Plat Red Raspberries—Reynolds & Tracy, Old Mission.
6. Ornamental Grounds—Mrs. A. H. Tracy, Old Mission.
7. Apple Orchard—George Parmelee, Old Mission.
8. Pear Orchard—George Parmelee, Old Mission.
9. Cherry Orchard—George Parmelee, Old Mission.
10. Apple Orchard—Samuel B. Smith, Grand Rapids.
11. Young Peach Orchard—L. Chubb, Blackberry Ridge, Oceana county.
12. Bearing Peach Orchard—L. Chubb, Blackberry Ridge, Oceana county.
13. Plum Orchard—L. Chubb, Blackberry Ridge, Oceana county.
14. Peach Orchard—C. A. Sessions, Blackberry Ridge, Oceana county.
15. Peach Orchard—J. H. Sammons, Blackberry Ridge, Oceana county.
16. Peach Orchard—Chas. W. Jay, Blackberry Ridge, Oceana county.
17. Young Peach Orchard—Chas. W. Jay, Blackberry Ridge, Oceana county.
18. Plum Orchard—Chas. W. Jay, Blackberry Ridge, Oceana county.
19. Quince Orchard—Chas. W. Jay, Blackberry Ridge, Oceana county.
20. Pear Orchard—Wm. Sours, Blackberry Ridge, Oceana county.
21. Plum Orchard—Wm. Sours, Blackberry Ridge, Oceana county.
22. Apple Orchard—C. A. Sessions, Blackberry Ridge, Oceana county.
23. Apple Orchard—H. E. Russell, Hart, Oceana county.
24. Apple Orchard—W. F. Lake, Shelby, Oceana county.
25. Cranberry Garden—Grosvener Reed, Robinson, Ottawa county.
26. Vineyard—John Williams, South Haven.
27. Currants—D. M. Shoemaker, South Haven.
28. Fruit Garden—H. E. Bidwell, South Haven.
29. Apple Orchard—L. H. Bailey, South Haven.
30. Young Peach Orchard—L. H. Bailey, South Haven.

31. * Peach Orchard—H. J. Linderman, South Haven.
32. * Young Peach Orchard—J. J. Atherley, South Haven.
33. * Vineyard—Hiram Griffin, South Haven.
34. Cherry Orchard—J. G. Ramsdell, South Haven.
35. Plum Orchard—C. T. Bryant, South Haven.
36. Dwarf Pear Orchard—C. T. Bryant, South Haven.
37. Peach Orchard—C. T. Bryant, South Haven.
38. Pear Orchard—Joseph Lamm, South Haven.
39. Young Peach Orchard—Joseph Lamm, South Haven.
40. Apple Orchard (young)—Wm. H. Miller, Berrien Springs.
41. Young Pear Orchard—Wm. H. Miller, Berrien Springs.
42. Peach Orchard—A. Engle, Paw Paw.
43. Peach Orchard—C. Engle, Paw Paw.
44. Young Peach Orchard—C. Engle, Paw Paw.
45. Pear Orchard—C. Engle, Paw Paw.
46. Plum Orchard—C. Engle, Paw Paw.
47. Vineyard—C. Engle, Paw Paw.
48. Vineyard—L. G. Bragg & Co., Kalamazoo.
49. Nursery—L. G. Bragg & Co., Kalamazoo.
50. Apple Orchard—Joseph H. Wetmore, Allegan.
51. Plum Orchard—Porter Beal, Rollin, Lenawee county.
52. Concord Vineyard—N. E. Smith, Ionia.
53. Concord Vineyard—N. E. Smith, Ionia.
54. Delaware Vineyard—N. E. Smith, Ionia.
55. Peach Orchard—N. E. Smith, Ionia.
56. Vineyard—J. C. Sterling, Monroe.
57. Vineyard—Charles Toll, Monroe.
58. Nursery—I. E. Ilgenfritz, Monroe.
59. Young Apple Orchard—D. Ilgenfritz, Monroe.
60. Young Pear Orchard—D. Ilgenfritz, Monroe.
61. Quince Orchard—D. Ilgenfritz, Monroe.
62. Vineyard—Joseph Sedlacek, Monroe.
63. Vineyard—Leonard Reisig, Monroe.
64. Vineyard—John W. Reisig, Monroe.
65. Apple Orchard—S. W. Dorr, Manchester.
66. Apple Orchard—Chas. Cain, Reading, Hillsdale county.
67. Fruit Garden—H. B. Chapman, Reading, Hillsdale county.
68. Ornamental Grounds—Mrs. Fred. Bush, Kalamazoo.

LIST OF AWARDS (DIPLOMAS).

- Bearing Apple Orchard—L. H. Bailey, South Haven.
 Young Apple Orchard—D. Ilgenfritz, Monroe.
 Pear Orchard—Geo. Parmelee, Old Mission.
 Bearing Peach Orchard—H. J. Linderman, South Haven.
 Young Peach Orchard—Joseph Lamm, South Haven.
 Bearing Plum Orchard—J. G. Ramsdell, Traverse City.
 Young Plum Orchard—C. Engle, Paw Paw.
 Bearing Cherry Orchard—George Parmelee, Old Mission.
 Young Cherry Orchard—J. G. Ramsdell, South Haven.

* This entry lies in Allegan county.

Vineyard—Chas. Toll, Monroe.

Fruit Garden—H. E. Bidwell, South Haven.

Ornamental Grounds—Mrs. Fred. Bush, Kalamazoo.

Plat Currants—D. M. Shoemaker, South Haven.

Quince Orchard—D. Ilgenfritz, Monroe.

Plat Raspberries—Reynolds & Tracy, Old Mission.

The members of the committee were unanimous in recommending a change in the classification of the objects in division A. In accordance with the proposed change in classification, we recommend diplomas for the above list. Full reasons will be given in the final report.

W. J. BEAL,
A. G. GULLEY,
C. N. MERRIMAN,
Committee.

DIVISION B—COUNTY COLLECTIONS.

Class 1. County Collection of twenty Market Apples—First premium, A. A. Olds, Decatur, Van Buren county, \$20; second premium, J. M. Blowers, Lawrence, Van Buren county, \$15; third premium, Wm. Rowe, Grand Rapids, Kent county, \$10.

There were entries in this class from Jackson county, by H. F. Thomas; Hillsdale county, by H. B. Chapman; Monroe county, by Reynolds, Lewis & Co.; and by the Oceana Pomological Society. All of the collections were good for this season, and between those that were the best there was not much choice. But the committee took into consideration as a prominent point, the condition of the specimens as regards the effects of the codling moth, and found that the finest looking collection in the whole list was very wormy, which lowered its standing below some of the entries that were not so highly colored.

Class 2. County Collection of Peaches—First premium, South Haven Pomological Society, Van Buren county, \$15; second premium, F. J. Dowland, Ludington, Mason county, \$10.

Class 3. County Collection of Pears—First premium, Reynolds, Lewis & Co., Monroe county, \$15; second premium, L. G. Bragg & Co., Kalamazoo county, \$10; third premium, H. B. Chapman, Reading, Hillsdale county, \$5.

Class 4. County Collection of Grapes—First premium, L. G. Bragg & Co., Kalamazoo county, \$12; second premium, Wm. Rowe, Grand Rapids, Kent county, \$7.

A beautiful collection of foreign and native grapes in a mixed collection was entered by Mr. A. Sigler, of Adrian, which by decision of the Executive Committee could not come in competition with the collections that were entirely native, and was awarded a discretionary premium of five dollars.

Class 5. County Collection of Plums—First premium, E. J. Shirts, Shelby, Oceana county, \$10; second premium, F. J. Dowland, Ludington, Mason county, \$5.

Committee—Eli Bidelman, Coldwater, and Emmons Buel, Kalamazoo.

DIVISION C—TOWNSHIP COLLECTIONS.

Class 1. Township Collection of Apples—First premium, J. M. Blowers, Lawrence, Van Buren county, \$15; second premium, B. G. Buel, Little Prairie Ronde, Cass county, \$10; third premium, I. E. Ilgenfritz, Monroe, Monroe county, \$5.

There were nine entries in this class, and nearly all of them meritorious. The committee found that they must adopt a system of work before attempting to award premiums, so it was thought best to give special attention to three leading points, viz.: general appearance of the collections, the varieties as to their market qualities, the condition of specimens as to imperfections. This necessitated a considerable amount of labor, but resulted in perfect unanimity in the decisions.

Class 2. Township Collection of Peaches—First premium, South Haven Pomological Society, Township of South Haven, \$8; second premium, C. A. Sessions, Blackberry Ridge Township, Oceana county, \$5; third premium, Jos. C. Wood, Tompkins, Jackson county, \$3.

A fine collection by F. J. Dowland, of Ludington, was found worthy of special notice, but not sufficiently meritorious to out-rank those receiving the awards.

Class 3. Township Collection of Pears—First Premium, H. B. Chapman, Reading, Hillsdale county, \$8; second premium, I. E. Ilgenfritz & Co., Monroe, \$5; third premium, L. G. Bragg & Co., Kalamazoo, \$3.

Class 4. Township Collection of Grapes—First premium, L. G. Bragg & Co., Kalamazoo, \$6.

Class 5. Township Collection of Plums—First premium, E. J. Shirts, Shelby, Oceana county, \$5; second premium, F. J. Dowland, Ludington, Mason county, \$3.

Your committee found a very convenient arrangement of fruit. The collections were side by side so that a comparative estimate could be easily made. Evidently the superintendent in charge had done his duty. But the darkness of the hall and the narrowness of the shelves upon which the fruit was placed were very unfortunate circumstances. The fruit did not show well, neither was it possible to remove for comparison any single plate, without a general disturbance of all, which might be avoided with a proper arrangement of shelving and a good quality of plates. The full shelves and the number of entries in each class were a credit to the members of the State Pomological Society who have made the effort for a display this year of scarcity. In a comparison with the awarded premiums of last year we find that there are very many more awarded this season, and a larger list of entries in the divisions upon which we were to pass judgment. A beautiful society collection, for which there is no place in the premium list of this year, we found entered by the South Haven Pomological Society. It consisted of fruits in variety, and in consideration of its merit we recommend that the diploma of the State Pomological Society be awarded this exhibit.

Committee—Eli Bidelman, Coldwater; Emmons Buel, Kalamazoo.

DIVISION D—COLLECTIONS EXHIBITED BY INDIVIDUALS.

Class 1. Collection of fruit grown by exhibitor—First premium, Reynolds, Lewis & Co., Monroe, \$20; second premium, I. E. Ilgenfritz, Monroe, \$15; third premium, C. A. Sessions, Blackberry Ridge, \$10; Fourth premium, David Geddes, Saginaw, \$5.

Your committee on this division find four entries, two of which are especially fine, these were awarded first and second premiums, either of which would reflect credit upon any grower in any State. Apples, pears and grapes were very fully represented in these collections. Too much cannot be said of these firms in praise

of the energy and care required in bringing together such extensive exhibits. The collections of apples in both of these entries in this year of scarcity is quite wonderful, and we desire to call especial attention to this portion of their exhibits. The collection taking the third award, from Oceana county, was also a fair exhibit, and, coming as it does from a new country, it conveys the impression that ere many years the older settled portions of Michigan will have a close competitor in the fruit from this county. The collections were all worthy of premiums and we granted them in accordance with instructions. Your committee wish to add further that there came too late for entering a collection from the township of Peninsula, Grand Traverse, in care of H. G. Reynolds. It consisted of six plates of apples, four plates of pears, four plates of peaches and ten plates of plums. This exhibit was exceedingly fine, and speaks loudly in favor of the Grand Traverse region as a fruit country. The plates of Maiden's Blush, all of the pears, and many of the peaches, rivaled anything in the hall.

Committee—C. Engle, Paw Paw; E. J. Shirts, Shelby; J. N. Stearns, Kalamazoo.

DIVISION E—APPLES.

Class 1. Collection of apples grown by exhibitor—This class was given into the hands of a special committee consisting of S. O. Knapp, of Jackson, A. C. Glidden, Paw Paw, and C. N. Merriman, Grand Rapids, who made the following awards: First premium, I. E. Ilgenfritz, Monroe, \$20; second premium, W. D. Manly, Hartford, Van Buren Co., \$15; third premium, J. M. Blowers, Lawrence, \$10; Fourth premium, Thomas Jewett, Chelsea, Washtenaw Co., \$5.

Class 3. Plate Red Astrachan—Third premium, Reynolds, Lewis & Co., Monroe, 25c, four specimens shown and one wormy.

Class 4. Plate Duchess of Oldenburg—Second premium, C. A. Sessions, Blackberry Ridge, 50c, one poor specimen.

Class 5. Plate Maiden's Blush—First premium, H. F. Thomas, Jackson, 75c; second premium, Mrs. D. H. Ranney, Jackson, 50c; third premium, W. A. Holcomb, Francisco, 25c.

Class 6. Plate of Primate—First premium, N. & C. Chilson, Battle Creek, 75c; second premium, South Haven Pomological Society, 50c.

Class 7. Plate Large Yellow Bough—First premium, South Haven Pomological Society, 75c.

Class 10. Plate Early Strawberry—First premium, Reynolds, Lewis & Co., Monroe, 75c.

Class 11. Plate Early Joe—First premium, Reynolds, Lewis & Co., Monroe, 75c.

Class 13. Plate Lowell—First premium, South Haven Pomological Society, 75c; second premium, Wm. Rowe, Grand Rapids, 50c.

Class 14. Plate Porter—First premium, Reynolds, Lewis & Co., Monroe, 75c, all specimens perfect; second premium, W. A. Holcomb, Francisco, 50c; third premium, South Haven Pomological Society, 25c.

Class 16. Plate Cayuga Red Streak—First premium, Robt. Van Brunt, St. Joseph, 75c; second premium, Reynolds, Lewis & Co., Monroe, 50c; third premium, South Haven Pomological Society, 25c.

Class 17. Plate Chenango Strawberry—First premium, Wm. Rowe, Grand Rapids, 75c; second premium, South Haven Pomological Society, 50c. Both plates were exceedingly fine but the former was as a whole the more perfect.

Class 20. Plate Jersey Sweet—First premium, South Haven Pomological Society, 75c; second premium, D. Woodman, Paw Paw, 50c; third premium, W. A. Holcomb, Francisco, 25c.

Class 21. Plate Blenheim Pippin—Second premium, D. Woodman, Paw Paw, 50c.

Class 22. Plate Fall Pippin—First premium, Reynolds, Lewis & Co., 75c; second premium, N. & C. Chilson, 50c; third premium, South Haven Pomological Society, 25c.

Class 24. Plate Haskell Sweet—Second premium, W. A. Holcomb, 50c, too imperfect for first premium.

Class 27. Plate Autumn Swaar—First premium, N. & C. Chilson, 75c; second premium, Wm. Rowe, Grand Rapids, 50c.

Class 28. Plate Jonathan—Second premium, Wm. Rowe, 50c.

Class 29. Plate Peck's Pleasant—First premium, Reynolds, Lewis & Co., 75c; second premium, B. O. Wing, Leslie, 50c; third premium, South Haven Pomological Society, 25c.

Class 30. Plate Rhode Island Greening—First premium, South Haven Pomological Society, 75c; second premium, Reynolds, Lewis & Co., 50c; third premium, B. F. Green, Jackson, 25c.

Class 31. Plate Baldwin—First premium, W. D. Manley, Hartford, 75c; second premium, Reynolds, Lewis & Co., 50c; third premium, H. B. Chapman, Reading, 25c.

Class 32. Plate Red Canada—First premium, J. M. Blowers, Lawrence, 75c; second premium, Reynolds, Lewis & Co., 50c; third premium, D. Woodman, 25c.

Class 33. Plate Golden Russet—First premium, N. & C. Chilson, 75c; second premium, M. J. Graham, Leslie, 50c; third premium, B. O. Wing, Leslie, 25c.

Class 34. Plate Roxbury Russet—First premium, D. Woodman, 75c; second premium, J. M. Blowers, 50c; third premium, South Haven Pomological Society, 25c.

Class 35. Plate Wagener—First premium, A. A. Olds, Decatur, 75c; second premium, J. N. Smith, Bath, 50c; third premium, H. F. Thomas, Jackson, 25c.

Class 36. Plate Northern Spy—First premium, South Haven Pomological Society, 75c; second premium, Reynolds, Lewis & Co., Monroe, 50c; third premium, J. M. Blowers, Lawrence, 25c.

Class 37. Plate Belmont—First premium, Reynolds, Lewis & Co., 75c; second premium, J. M. Blowers, 50c; third premium, South Haven Pomological Society, 25c.

Class 38. Plate Fameuse—First premium, J. N. Smith, Bath, 75c; second premium, Reynolds, Lewis & Co., 50c; third premium, South Haven Pomological Society, 25c.

Class 39. Plate Bailey's Sweet—Third premium, South Haven Pomological Society, 25c.

Class 40. Plate Westfield Seek-no-further—First premium, Reynolds, Lewis & Co., 75c; second premium, South Haven Pomological Society, 50c; third premium, A. A. Olds, Decatur, 25c.

Class 41. Plate Hubbardston Nonsuch—South Haven Pomological Society, first premium, 75c.

Class 42. Plate King of Tompkins County—Reynolds, Lewis & Co., first pre-

mum, 75c; second premium, Robert Van Brunt, St. Joseph, 50c; third A. A. Olds, Decatur, 25c.

Class 43. Plate Yellow Bellflower—Reynolds, Lewis & Co., first premium, 75c; second premium, South Haven Pomological Society, 50c; third premium, J. N. Smith, Bath, 25c.

Class 44. Plate Tallman's Sweet—Reynolds, Lewis & Co., first premium, 75c; second premium, E. J. Shirts, 50c; third premium, B. O. Wing, 25c.

Class 45. Plate Ladies' Sweet—B. G. Buel, Little Prairie Ronde, first premium, 75c.

Class 47. Plate Grimes' Golden—A. O. Winchester, second premium, 50c; third premium, South Haven Pomological Society, 25c.

Class 48. Plate Swaar—South Haven Pomological Society, first premium, 75c; second premium, Reynolds, Lewis & Co., 50c.

Class 49. Plate Esopus Spitzenburg—N. & C. Chilson, first premium, 75c; second premium, J. N. Smith, 50c; third premium, A. A. Olds, 25c.

Class 51. Plate any other Valuable Variety—First premiums, H. F. Thomas, Jackson, Hubbell, 75c; A. A. Olds, Decatur, Van Buren county, Byers' Beauty Crab, 75c; W. D. Manley, Gilliflower, 75c; E. J. Shirts, Alexander, 75c; E. J. Shirts, Benoni, 75c. Second premiums: H. B. Chapman, Reading, Winter Gilliflower, 50c; Wm. Rowe, Alexander, 50c. Third premiums: John Whittlesey, St. Joseph, Alexander, 25c; H. F. Thomas, Oakland county Seek-no-further, 25c.

Class 52. Collection Siberian Crab Apples—South Haven Pomological Society, first premium, 75c.

Class 53. Single variety Siberian crab apple—Wm. Rowe, first premium, 75c; second premium, E. J. Shirts, 50c.

Class 54. Plate Transcendent Crab—E. J. Shirts, first premium, 75c; second premium, Wm. Rowe, 50c.

Class 57. Plate Hyslop Crab—E. J. Shirts, first premium, 75c.

The committee found entries in a number of the classes which were not worthy of premiums on account of defects in the fruit, or a lack of the required number of specimens, even although they were the only ones entered in their classes.

Committee—C. N. Merriman Grand Rapids; W. J. Beal, Lansing; R. W. Judd, Parma.

DIVISION F—PEARS.

Class 1. Collection of pears grown by exhibitor—I. E. Ilgenfritz, Monroe, first premium, \$15; second premium, L. G. Bragg & Co., \$10; third premium, George L. Burrows, Saginaw City, \$5.

Class 10. Plate Bartlett—A. O. Winchester, St. Joseph, first premium, \$1; second premium, A. Sigler, Adrian, 50c.

Class 11. Plate Buffum—South Haven Pomological Society, first premium, \$1; second premium, Reynolds, Lewis & Co., 50c.

Class 12. Plate Flemish Beauty—George L. Burrows, Saginaw City, first premium, \$1; second premium, Reynolds, Lewis & Co., 50c.

Class 13. Plate Seckel—L. G. Bragg & Co., first premium, \$1; second premium, John Whittlesey, St. Joseph, 50c.

Class 14. Plate Onondaga—I. E. Ilgenfritz, first premium, \$1; second premium, L. G. Bragg & Co., 50c.

Class 15. Plate White Doyenné—Geo. L. Burrows, first premium, \$1; second premium, I. E. Ilgenfritz, 50c.

Class 16. Plate Beurré d'Anjou—Geo. L. Burrows, first premium, \$1; second premium, C. Engle, 50c.

Class 18. Plate Sheldon—I. E. Ilgenfritz, first premium, \$1; second premium, Reynolds, Lewis & Co., 50c.

Class 21. Plate Beurré Bosc—L. G. Bragg & Co., first premium, \$1; second premium, C. Engle, 50c.

Class 23. Plate Lawrence—L. G. Bragg & Co., first premium, \$1; second premium, I. E. Ilgenfritz, 50c.

Class 24. Plate Beurré Diel—L. G. Bragg & Co., first premium, \$1; second premium, C. Engle, 50c.

Class 25. Plate Winter Nêlis—I. E. Ilgenfritz, first premium, \$1; H. B. Chapman, Reading, 50c.

Class 26. Plate Beurré Clairgeau—L. G. Bragg & Co., first premium, \$1; second premium, Reynolds, Lewis & Co., 50c.

Class 28. Any other valuable variety—Robert Von Brunt, St. Joseph, Duchess d'Angouleme, \$1; second premium, A. O. Winchester, Vicar, 50c.

Committee—Emmons Buel, Kalamazoo; E. J. Shirts, Shelby.

DIVISION G—PEACHES.

Class 1. Collection of Peaches—South Haven Pomological Society, first premium, \$10.

Class 5. Plate Honest John—Thomas Jewett, Chelsea, first premium, \$1.

Class 6. Plate Early Crawford—South Haven Pomological Society, first premium, \$1; second premium, H. W. Doney, Jackson, 50c.

Class 8. Plate Old Mixon Free—Second premium, South Haven Pomological Society, 50c.

Class 9. Plate Jacques' Rareripe—South Haven Pomological Society, first premium, \$1.

Class 10. Plate Crawford's Late—Mrs. Dwight Merriman, Jackson, first premium, \$1; second premium, A. A. Olds, 50c.

Class 11. Plate Hill's Chili—C. Engle, first premium, \$1; second premium, South Haven Pomological Society, 50c.

Class 12. Plate Smock Free—South Haven Pomological Society, first premium, \$1.

Class 15. Plate White Imperial—South Haven Pomological Society, second premium, 50c.

Class 19. Plate Late Red Rareripe—H. B. Chapman, second premium, 50c.

Class 20. Plate any other variety—South Haven Pomological Society, Smiley, first premium, \$1; second premium, H. B. Chapman, Morris White, 50c.

Seedling peaches were entered by S. E. Cooper, of Francisco, F. J. Dowland, Ludington, J. C. Wood, Tompkins Center, M. Allen, Jackson, and A. Sigler, Adrian. The committee make no award of premiums, but would mention Mr. Sigler's peach as the best, and Mr. Wood's as second. The former was entered for name and the committee simply say that it resembles an old peach so closely that without the tree has some distinctive peculiarities it needs no further naming.

Committee—J. M. Blowers, Lawrence; Richard W. Judd, Parma.

DIVISION H—GRAPES.

Class 1. Collection of Native Grapes grown by Exhibitor—L. G. Bragg & Co., first premium, \$10; second premium, C. F. Goodhue, Owosso, \$7; third premium, A. P. Gaylord, Eaton Rapids, \$5.

Class 2. Collection of Foreign Grapes grown under Glass—A. Sigler, first premium, \$15.

Class 3. Five bunches Martha—C. Engle, first premium, \$1; second premium, Thomas Archer, 50c.

Class 4. Five bunches Hartford Prolific—A. J. Gould, Jackson, first premium, \$1; second premium, W. K. Gibson, Jackson, 50c.

Class 5. Five bunches Eumelan—L. G. Bragg & Co., first premium, \$1.

Class 6. Five bunches Delaware—N. & C. Chilson, first premium, \$1; second premium, C. Engle, 50c.

Class 7. Five bunches Isabella—L. G. Bragg & Co., first premium, \$1; second premium, N. & C. Chilson, 50c.

Class 8. Five bunches Concord—N. & C. Chilson, first premium, \$1; second premium, John Whittlesey, St. Joseph, 50c.

Class 9. Five bunches Iona—Thomas Archer & Co., first premium, \$1; second premium, Wm. Rowe, 50c.

Class 10. Five bunches Ives' Seedling—C. Engle, Paw Paw, first premium, \$1; second premium, L. G. Bragg & Co., 50c.

Class 11. Five bunches Diana—N. & C. Chilson, first premium, \$1; second premium, L. G. Bragg & Co., 50c.

Class 12. Five bunches Agawam—First premium, John Whittlesey, \$1; second premium, N. & C. Chilson, 50c.

Class 13. Five bunches Adirondac—Thos. Archer & Co., \$1; second premium, A. J. Gould, Jackson, 50c.

Class 14. Five bunches Crevelling—W. K. Gibson, Jackson, first premium, \$1.

Class 15. Five bunches Croton—E. F. Guild, East Saginaw, first premium, \$1.

Class 16. Five bunches Rebecca—Wm. Rowe, first premium, \$1.

Class 19. Plate Kalamazoo—L. G. Bragg & Co., first premium, \$1.

Class 20. Any other variety—C. Engle, Catawba, first premium, \$1; second premium, W. K. Gibson, Salem, 50c.

Your committee have performed the duty assigned them as best they could. They found the grapes on exhibition placed on narrow stairs in a darkened hall, covered with dust and not unfrequently highly ornamented by the pilfering fingers of admiring visitors. We can hardly hope the exhibitors will be satisfied, as we certainly are not. Hoping for more light in the future, we respectfully submit our awards.

Committee—Emmons Buel, W. L. Moore.

DIVISION J—PLUMS, ETC.

Class 3. Plate Lombard—First premium, F. J. Dowland, Ladington, \$1; second premium, E. J. Shirts, Shelby, 50c.

Class 5. Plate Yellow Egg—First premium, F. J. Dowland, \$1; second premium, South Haven Pomological Society, 50c.

Class 6. Plate Coc's Golden Drop—First premium F. J. Dowland, \$1; second premium, E. J. Shirts, 50c.

Class 7. Plate Bayay's Green Gage—First premium, South Haven Pomological Society, \$1; second premium, E. J. Shirts, Shelby, 50c.

Class 8. Plate Canada Egg—First premium, S. W. Fowler, Manistee, \$1.

Class 15. Plate Imperial Gage—First premium, E. J. Shirts, \$1.

Class 17. Plate of any other variety—First premium, F. J. Dowland, Lawrence Favorite, \$1; second premium, South Haven Pomological Society, German Prune, 50c.

Class 18. Plate Quinces—First premium, L. G. Bragg & Co., Kalamazoo, \$1; second premium, H. B. Chapman, Reading, 50c.

Special Collection Native Nuts—First premium, Mrs. S. Woodward, Waterloo, \$1.

Your committee failed to find the individual collection of plums entered by F. J. Dowland, and owing to the lack of the required number of varieties of plums in the entry of E. J. Shirts, no premium is awarded in Class 1. Several single plates of plums were also missing from their proper place.

Committee—T. T. Lyon, South Haven; N. Chilson, Battle Creek; H. Dale Adams, Galesburgh.

DIVISION K—DRIED FRUITS AND VEGETABLES.

Class 1. Collection of Dried Fruits by any Process—First premium, Farmers' Fruit Preserving Company, Adrian, diploma.

Class 2. Collection of Dried Fruit, Product of one Factory or Individual—First premium, L. Granger, Armada, diploma.

Class 3. Collection Domestic Dried Fruits, Product of one Family or Individual—First premium, L. C. Lincoln, Greenville, \$2.50.

Class 4. Dried Apples—First premium, Elva Crego, Liberty, \$1.

Class 5. Dried Pears—First premium, Mrs. Richard Elliott, Lansing, \$1.

Class 6. Dried Peaches—First premium, L. C. Lincoln, \$1.

Class 7. Dried Plums—First premium, Mrs. A. McClary, Galesburgh, \$1.

Class 8. Dried Cherries—First premium, Mrs. A. McClary, \$1.

Class 9. Dried Strawberries—First premium, L. C. Lincoln, \$1.

Class 10. Dried Raspberries—First premium Mrs. A. McClary, \$1.

Class 12. Dried Whortleberries—First premium, L. C. Lincoln, \$1.

Class 14. Dried Currants—First premium, Mrs. A. McClary, \$1.

Class 15. Dried Gooseberries—First premium, L. C. Lincoln, \$1.

Class 16. Dried Elderberries—First premium, Mrs. R. M. Cook, Charlotte, \$1.

Class 17. Dried Grapes—First premium, Mrs. Richard Elliott, \$1.

Special. Dried Crab Apples—First premium, L. C. Lincoln, \$1.

The committee would respectfully report that they find on exhibition a fine collection of fruit and vegetables dried by the Farmers' Fruit Preserving Company, of Palmyra, by the Alden process, to which a diploma was awarded.

They also found a collection, the product of the Family Fruit and Vegetable Evaporator of L. Granger, Armada, to which a diploma was awarded.

The first premium was given L. C. Lincoln for a fine collection of domestic dried fruit.

All the specimens of the different varieties of dried fruit were found in excellent condition, and there was some difficulty in deciding between the different entries. The committee would also concede the superiority of the fruit and vegetables dried by the Alden process to that dried by any other method.

Some excellent dried fruit was on exhibition by Mrs. R. M. Cook, of Charlotte, having been perfectly preserved for two years, of which the committee would make special mention.

Committee—James Satterlee, Greenville; Mrs. A. J. Gould, Jackson.

DIVISION L—CANNED AND PICKLED FRUITS.

Class 2. Collection of Canned and Pickled Fruits—First premium, Mrs. M. W. Clark, Parma, \$5.

Class 3. Canned Apples—First premium, Mrs. G. W. Prescott, Grand Rapids, \$1.

Class 4. Pears—First premium, Mrs. G. W. Prescott, \$1.

Class 5. Peaches—First premium, Mrs. Harrison Snow, Horton, \$1.

Class 6. Plums—First premium, Mrs. G. W. Prescott, \$1.

Class 7. Cherries—First premium, Belle Crawford, Jackson, \$1.

Class 8. Siberian Crab Apples—First premium, L. C. Lincoln, Greenville, \$1.

Class 9. Strawberries—First premium, Mrs. M. W. Clark, \$1.

Class 10. Raspberries—First premium, Mrs. M. W. Clark, \$1.

Class 11. Blackberries—First premium, Mrs. G. W. Prescott, \$1.

Class 12. Whortleberries—First premium, L. C. Lincoln, \$1.

Class 13. Quinces—First premium, Mrs. John F. Drew, Jackson, \$1.

Class 14. Gooseberries—First premium, W. G. Fulkerson, Ovid, \$1.

Class 15. Currants—First premium, Mrs. G. W. Prescott, \$1.

Class 16. Grapes—First premium, Mrs. G. W. Prescott, \$1.

Class 17. Pickled Pears—First premium, Belle Crawford, \$1.

Class 18. Pickled Peaches—First premium, L. C. Lincoln, \$1.

Class 19. Pickled Cherries—First Premium, L. C. Lincoln, \$1.

There was a long list of canned goods on exhibition marked as special, from the fact that no premiums were offered by the Society for them. These were canned vegetables principally, and were very fine. Mrs. M. W. Clark exhibited a nice line of canned and pickled vegetables that we desire to commend very highly, but inasmuch as these entries belong strictly with the State Agricultural Society, we are not at liberty to recommend a premium. Belle Crawford, Mrs. Chisholm, L. C. Lincoln, and Mrs. G. W. Prescott, all made beautiful exhibits of canned goods, and the whole display was far superior to anything your committee ever saw at a Michigan State Fair.

Committee—A. J. Gould, Jackson; Mrs. C. C. Turner Jackson; Mrs. E. N. Holcomb, Jackson.

DIVISION M—PRESERVED FRUITS AND JELLIES.

Class 1. Collection Preserved Fruits and Jellies put up by Exhibitor—First premium, L. C. Lincoln, Greenville, \$1.

Class 2. Cider Apple Sauce—First premium, Mrs. A. McClary, Galesburg, \$1.

Class 3. Preserved Pears—First premium, Mrs. M. W. Clark, Parma, \$1.

Class 4. Preserved Peaches—First premium, L. C. Lincoln, \$1.

Class 5. Preserved Plums—First premium, Mrs. M. W. Clark, \$1.

Class 6. Preserved Cherries—First premium, Mrs. M. W. Clark, \$1.

Class 7. Preserved Strawberries—First premium, L. C. Lincoln, \$1.

Class 8. Preserved Raspberries—First premium, L. C. Lincoln, \$1.

Class 9. Preserved Blackberries—First premium, Mrs. M. W. Clark, \$1.

Class 10. Preserved Whortleberries—First premium, Mrs. G. W. Prescott, Grand Rapids, \$1.

Class 12. Preserved Currants—First premium, L. C. Lincoln, \$1.

Class 13. Collection jellies—First premium, T. J. Chisholm, Marshall, \$2.

Class 14. Currant Jelly—First premium, L. C. Lincoln, \$1.

Class 15. Apple Jelly—First premium, Mrs. H. B. Chapman, Reading, \$1.

Class 16. Siberian Crab Apple Jelly—First premium, T. J. Chisholm, \$1.

Class 17. Grape Jelly—First premium, Mrs. J. Shepherd, Saginaw City, \$1.

Class 18. Raspberry Jelly—First premium, T. J. Chisholm, \$1.

Class 19. Blackberry Jelly—First premium, Mrs. M. W. Clark, \$1.

Class 20. Under this class there were a large number of worthy entries, and the committee awarded the premiums as follows: Mrs. M. W. Clark, first premiums on Egg Plum Jelly, \$1, Strawberry Jelly, \$1, Orange Jelly, \$1, Roger's Hybrid Grape Jelly, \$1, Red Currant Jelly, \$1, Blue Plum Jelly, \$1, Peach Jelly, \$1; Mrs. J. Shepherd, first premium, Tomato Jelly, \$1; Mrs. Carrie Armstrong, first premium, Green Grape Jelly, \$1; L. C. Lincoln, first premium, Gooseberry Jelly, \$1.

Class 21. Quince Jelly—First premium, H. B. Chapman, \$1.

There was an immense quantity of material for the committee to go over and compare, and they found their work very arduous. In many instances it was exceedingly difficult to determine which was the most deserving; but in making the decisions the committee were actuated only by the desire to do justice by all.

Committee—A. J. Gould, Jackson; Mrs. C. C. Turner, Jackson; Mrs. E. N. Holcomb, Jackson.

DIVISION N—WINES, CIDER, VINEGAR, ETC.

Class 5. Concord Wine—First premium, Mrs. D. H. Ranney, Jackson, \$1.

Class 11. Any other variety Native Wine—First premium, Mrs. J. Shepherd, Saginaw City, Red Raspberry Wine, \$1; second premium, Mrs. D. H. Ranney, Raspberry Wine, 50c.

Class 13. Currant Wine—First premium, Mrs. John F. Drew, Jackson, \$1; second premium H. B. Chapman, Reading, 50c.

Class 14. Blackberry Wine—First premium, J. Shepherd, \$1.

Class 15. Elderberry Wine—First premium, Mrs. Richard Elliot, Lansing, \$1.

Class 17. Boiled Cider—First premium, Mrs. John F. Drew, \$1; second premium, Mrs. R. M. Cook, Charlotte, 50c.

Class 18. Cider Vinegar—First premium, J. Shepherd, \$1; second premium, H. B. Chapman, 50c.

Special. Chene Bros., Detroit, White Wine Vinegar, \$1.

DIVISION O—NURSERY STOCK.

Class 2. Largest and Finest Collections of Nursery Stock of all kinds and Descriptions, Product of this State—First premium, L. G. Bragg & Co., Kalamazoo.

Class 2. Collection Apple Stock—First premium, W. G. Fulkerson, Ovid.

Special. Display Ornamental Nursery Stock—First premium, H. F. Thomas, Jackson; second premium, George Taylor, Kalamazoo; third premium, W. G. Fulkerson, Ovid.

The display, in its arrangement and intrinsic worth, of L. G. Bragg & Co., of Kalamazoo, was very excellent and worthy of special mention by the committee.

The two exhibits of ornamental nursery stock by H. F. Thomas and George

Taylor were very beautiful. Here were to be found our most hardy and beautiful evergreens tastefully arranged and skillfully grown, and the committee are glad to say: All honor to the men who are growing such beautiful trees to be added to the Michigan homes to embellish the country and educate the people in matters of taste in home embellishment.

Committee—A. A. Olds, Decatur; J. T. Bogue, Quincy.

DIVISION P—PLANTS IN POTS—PROFESSIONAL LIST.

Class 1. Twenty Greenhouse and Stove Plants of Different Varieties—First premium, C. Van Haaften, Kalamazoo, \$10; second premium, W. R. Hibbard, Jackson, \$1.

Class 2. Specimen Flowering Plant in Flower—First premium, W. R. Hibbard, \$2; second premium, Mrs. Dr. Andrews, Jackson, \$1; third premium, C. Van Haaften, 50c.

Class 3. Specimen Variegated Foliage Plant—First premium, Mrs. Dr. Andrews, \$2; second premium, W. R. Hibbard, \$1; third premium, C. Van Haaften, 50c.

Class 4. Six Greenhouse Plants in Flower—First premium, W. R. Hibbard, \$3; second premium, C. Van Haaften, \$2.

Class 5. Six Greenhouse Plants of Variegated Foliage—First premium, W. R. Hibbard, \$3; second premium, C. Van Haaften, \$2.

Class 6. Three Caladiums, named Varieties—First premium, W. R. Hibbard, \$2; C. Van Haaften, \$1.

Class 7. Six Begonias, named Varieties—First premium, W. R. Hibbard, \$2; second premium, C. Van Haaften.

Class 9. Six Fuchsias, named varieties—First premium, Mrs. Dr. Andrews, \$2; second premium, W. R. Hibbard, \$1.

Class 11. Six Single Flowering Geraniums—First premium, W. R. Hibbard, \$2.

Class 12. Four Double Flowering Geraniums—First premium, W. R. Hibbard, \$2.

Class 13. Six Coleus, named varieties—First premium, W. R. Hibbard, \$2; second premium, C. Van Haaften, \$1.

Class 14. Six Cacti, named varieties—First premium, W. R. Hibbard, \$2; second premium, C. Van Haaften, \$1.

Class 17. Six Lycopods—First premium, W. R. Hibbard, \$2.

Class 18. Specimen Plant Caladium—First premium, C. Van Haaften, \$1; second premium, W. R. Hibbard, 50c.

Class 19. Specimen Plant Dracena—First premium, C. Van Haaften, \$1.

Class 20. Specimen Plant Foliage Begonia—First premium, W. R. Hibbard, \$1.

Class 21. Specimen Plant Flowering Begonia—First premium, C. Van Haaften, \$1; W. R. Hibbard, second premium, 50c.

Class 22. Specimen Plant Alocasia—First premium, W. R. Hibbard, \$1.

Class 23. Specimen Plant Cissus—First premium, C. Van Haaften, \$1; second premium, W. R. Hibbard, 50c.

Class 24. Specimen Plant Clerodendron—W. R. Hibbard, first premium, \$1.

Class 25. Specimen Plant Hoya—W. R. Hibbard, first premium, \$1.

Class 27. Specimen Plant Centaurea—W. R. Hibbard, first premium, \$1; C. Van Haaften, second premium, 50c.

Class 28. Specimen Plant *Sanchezia nobilis*—C. Van Haaften, first premium, \$1; W. R. Hibbard, second premium, 50c.

Class 29. Specimen Plant *Cineraria maritima*—C. Van Haaften, first premium, \$1.

Class 30. Specimen Plant *Coleus*—W. R. Hibbard, first premium, \$1.

Class 31. Specimen Plant *Fuchsia*—Mrs. Dr. Andrews, first premium, \$1.

Class 32. Specimen Plant *Agave*—C. Van Haaften, first premium, \$1.

Class 33. Specimen Plant Double *Geranium*—W. R. Hibbard, first premium, \$1.

Class 34. Specimen Plant Single *Geranium*—W. R. Hibbard, first premium, \$1.

Class 35. Specimen Plant *Hydrangea*—W. R. Hibbard, first premium, \$1.

Class 36. Specimen Plant *Bouvardia*—W. R. Hibbard, first premium, \$1.

Class 37. Specimen Plant *Calla*—W. R. Hibbard, first premium, \$1; C. Van Haaften, second premium, 50c.

Class 38. Specimen Plant *Nerium*—C. Van Haaften, first premium, \$1; W. R. Hibbard, second premium, 50c.

Class 39. Specimen Plant *Salvia*—Mrs. Dr. Andrews, first premium, \$1.

Class 40. Specimen Plant *Stevia*—W. R. Hibbard, first premium, \$1.

Class 41. Specimen Plant *Tuberose*—W. R. Hibbard, first premium, \$1.

Class 42. Specimen Plant *Palm*—W. R. Hibbard, first premium, \$1.

Class 43. Specimen Plant *Fern*—W. R. Hibbard, first premium, \$1; Mrs. Dr. Andrews, second premium, 50c.

Class 44. Specimen Plant *Lycopod*—Mrs. Dr. Andrews, first premium, \$1; C. Van Haaften, second premium, 50c.

Class 45. Specimen Plant any other variety not included in this division. The committee in this class had a painful duty to perform. At first they were led to believe that any worthy plant entered in this class should be awarded a premium; after the work was nearly completed, a more careful reading of the instructions revealed as their duty to make only six awards of first premiums and six of second premiums. With an entry list of over one hundred diverse plants this was a most difficult task indeed, and finally the committee decided under the circumstances to strain the rule somewhat, and make twelve first awards as follows: W. R. Hibbard, English Ivy, \$1, *Fabiana imbricata*, \$1, *Smilax*, \$1, *Pomegranate*, \$1, *Fig Tree*, \$1, *Justicia*, \$1; C. Van Haaften, *Sanseveria Zealandii*, \$1, *Aloe*, (Partridge Breast,) \$1, *Begonia rinceinifolia*, \$1, *Begonia subpeltata nigricans*, \$1, *Musa Cavendishii*, \$1, *Euphorbia splendens*, \$1.

Special. Hanging Basket filled with divers plants—Mrs. Dr. Andrews, \$1; Hanging Basket filled with one plant—Mrs. Dr. Andrews, \$1.

Your committee desire to say that in the display of plants in this division there were very many things worthy of special mention. Mr. Van Haaften, of Kalamazoo, and Mr. Hibbard, of Jackson, came here with loads of plants that helped to make a beautiful display, upon which they could get no premiums, because there were none offered. Their reward must be in the marked attention given to their exhibits by the large crowd of people who passed admiringly along. The constantly recurring expressions of appreciation of these exhibits were noticed by the committee with satisfaction, because it demonstrated the proposition that there is a growing interest on the part of the people in the beautiful things which our florists are growing with which to embellish homes and render them more attractive.

Committee—George Taylor, Kalamazoo; Mrs. A. J. Gould, Jackson; Mrs. A. Blair, Jackson.

DIVISION Q—PLANTS IN POTS—AMATEUR LIST.

Class 1. Twenty House Plants of Different Varieties—Mrs. W. K. Gibson, Jackson, first premium, \$10; Miss D. L. Field, Jackson, second premium, \$5.

Class 2. Specimen Flowering Plant in Flower—Mrs. W. K. Gibson, first premium, \$2.

Class 3. Specimen Variegated Foliage Plant—Mrs. W. K. Gibson, first premium \$2; Miss D. L. Field, second premium, \$1.

Class 4. Specimen Plant Ornamental Leaved Geranium—Mrs. W. K. Gibson, first premium, \$1.

Class 5. Specimen Plant Single Flowering Geranium—Miss D. L. Field, first premium, \$1; Mrs. W. K. Gibson, second premium, 50c.

Class 6. Specimen Plant Double Flowering Geranium—Miss D. L. Field, first premium, \$1; Mrs. W. K. Gibson, second premium, 50c.

Class 7. Specimen Plant Scented Geranium—Mrs. W. K. Gibson, first premium, \$1.

Class 8. Specimen Plant Ivy-leaved Geranium—Mrs. W. K. Gibson, first premium, \$1.

Class 9. Specimen Plant Lady Washington Geranium—Mrs. W. K. Gibson, first premium \$1.

Class 10. Collection of Any Four of the above Geraniums—Miss D. L. Field, first premium, \$2; Mrs. W. K. Gibson, second premium, \$1.

Class 11. Specimen Plant Abutilon—Miss D. L. Field, first premium, \$1; Mrs. W. K. Gibson, first premium, \$1.

The committee could not decide between two plants that were so nearly equal in merit, and recommend first premium to each.

Class 14. Specimen Plant Salvia—Mrs. W. K. Gibson, first premium, \$1.

Class 15. Specimen Plant Foliage Begonia—Mrs. W. K. Gibson, first premium, \$1; Mrs. R. M. Cook, Charlotte, second premium, 50c.

Class 16. Specimen Plant Flowering Begonia—Mrs. W. K. Gibson, first premium, \$1.

Class 17. Specimen plant Coleus—Miss D. L. Field, first premium, \$1; Mrs. W. K. Gibson, second premium, 50c.

Class 18. Specimen Plant Carnation—Miss D. L. Field, first premium, \$1; Mrs. W. K. Gibson, second premium, 50c.

Class 19. Specimen Plant Hoya—Mrs. W. K. Gibson, first premium, \$1.

Class 20. Specimen Plant Primrose—Mrs. W. K. Gibson, first premium, \$1.

Class 22. Specimen Plant Tuberosa—Mrs. W. K. Gibson, first premium, \$1; Miss D. L. Field, second premium, 50c.

Class 23. Specimen Plant any other Variety—Mrs. W. K. Gibson, first premiums, Banana, \$1; Fern, \$1; Hedychium, \$1; Hybiscus Cooperii, \$1; Se-forthia Elegans, \$1; Mrs. Richard Elliott, Lansing, Forbidden Fruit, \$1.

Class 24. Collection Native Ferns—Mrs. S. Woodward, Waterloo, second premium, \$1.

Class 27. Hanging Basket filled with one Plant—Mrs. Helen Depuy, Jackson, \$1.

Class 29. Climbing Plant on Trellis—Miss Nellie C. Jenkins, first premium, \$2; Mrs. W. K. Gibson, second premium, \$1.

The committee found it difficult to decide between the two, both were so well grown and trained.

Special—Two specimen Mallows—Mrs. S. Woodward, 50c.

Committee—Mrs. W. H. Withington, Jackson; Miss Ida Chilson, Battle Creek; Miss Ella Fletcher, Jackson.

DIVISION R—BEDDING PLANTS AND CUT FLOWERS.

Class 1. Twelve Bedding Plants—W. R. Hibbard, Jackson, first premium, \$3; Mrs. W. K. Gibson, Jackson, second premium, \$2; C. Van Haaften, third premium, \$1.

Mr. Van Haaften's collection was very excellent, and if it could have been near to the place designated for bedding plants might have had a better chance in comparison.

Class 2. Six Bedding Plants—Mrs. W. K. Gibson, first premium, \$2; W. R. Hibbard, second premium, \$1; Mrs. R. M. Cook, Charlotte, third premium, 50c.

C. Van Haaften made an entry in this class which was not to be found with the other bedding plants and was erased: subsequently the committee saw Mr. Van Haaften's entry, and do not hesitate to say that for health of plants and manner of growth this collection was equal to any on the ground. The committee wish to say in this connection, that to have justice done to all parties, it should be required that the entries in each division and each class, if possible, be together in one place.

Class 3. Display of Cut Flowers—W. R. Hibbard, first premium, \$3.

Class 4. Twelve Verbenas—W. R. Hibbard, first premium, \$2; Miss Nellie C. Jenkins, Jackson, second premium, \$1.

Class 5. Twelve Dahlias—John F. Ford, Detroit, first premium, \$2; Mrs. H. J. Leighton, Ypsilanti, second premium, \$1.

Class 6. Twelve Gladiolus—W. R. Hibbard, first premium, \$2.

Class 7. Twelve Chrysanthemums—W. R. Hibbard, first premium, \$2; Mrs. S. Woodward, recommended premium, 50c.

Class 8. Twelve roses—W. R. Hibbard, first premium, \$2.

Class 9. Twelve Asters—Miss Nellie C. Jenkins, first premium, \$2; John F. Ford, second premium, \$1.

Class 10. Twelve Pansies—H. Dale Adams, Galesburg, first premium, \$2; Mrs. A. Lockwood, Marshall, second premium, \$1.

Class 11. Twelve Zinnias, Mrs. Horace Tanner, Jackson, first premium, \$2; Mrs. D. H. Ranney, Jackson, second premium, \$1.

Class 12. Display Carnations—W. R. Hibbard, first premium, \$2.

Class 13. Display Stocks—Mrs. John F. Drew, Jackson, first premium, \$2.

Class 14. Display Hollyhocks—Mrs. R. M. Cook, second premium, \$1.

Class 15. Display Cockscorns—H. Dale Adams, first premium, \$2; Miss Nellie C. Jenkins; second premium, \$1.

Class 16. Display Phlox Drummondii—Mrs. A. Lockwood, first premium, \$2; Mrs. R. M. Cook, second premium, \$1.

Class 17. Display Antirrhinums—Mrs. A. Lockwood, first premium, \$2; L. C. Lincoln, Greenville, second premium, \$1.

Class 18. Display Ornamental Grasses—Mrs. R. M. Cook, first premium, \$2; Mrs. D. H. Ranney, second premium, \$1.

Special. Everlasting Flowers, L. C. Lincoln, first premium, \$2; Single Vel-

vet Marigold, Mrs. S. Woodward, Waterloo, second premium, \$1; Twelve Globe Amaranths, Mrs. Horace Tanner, Jackson, third premium, 50c.

Committee—Mrs. C. E. Tunnicliff, Jackson; Mrs. A. A. Bliss, Jackson.

DIVISION 8—FLORAL ARRANGEMENTS AND DESIGNS.

Class 1. Arrangement of Flowers for Dining Table—Mrs. W. K. Gibson, Jackson, first premium, \$2; Mrs. Dr. Andrews, Jackson, second premium, \$1.

Class 2. Small Design of any Kind—Mrs. Dr. Andrews, first premium, \$2; W. R. Hibbard, second premium, \$2.

Class 3. Flower Stand Filled and Trimmed—Mrs. W. K. Gibson, first premium, \$3.

Class 4. Pair Bouquets arranged in Formal Style—W. R. Hibbard, first premium, \$2.

Class 5. Pair Bouquets arranged in Natural Style—W. R. Hibbard, first premium, \$2.

Class 6. Arranged Dish of Cut Flowers—Mrs. W. K. Gibson, first premium, \$2.

Class 7—Floral Novelty, Miss Nellie C. Jenkins, Jackson, first premium, \$2; Mrs. D. F. Woodcock, Lansing, second premium, \$1.

Class 8. Pair Button-hole Bouquets—Mrs. Dr. Andrews, first premium, 50c; W. R. Hibbard, second premium, 25c.

Class 9. Tasteful arrangement of Autumn Leaves—Mrs. Dwight Merriman, Jackson, first premium, \$1; Mrs. W. K. Gibson, second premium, 50c.

A tastefully arranged basket of cut flowers shown by Mr. Hibbard, for which no premium was offered, is worthy of special notice by the committee.

Mr. E. Cooley made a delightful exhibit of Flowers in a glass case. The arrangement was made by his superintendent, Mr. Brockett. The character of the flowers making up the display and the exquisite taste displayed in their arrangement reflects great credit upon the establishment from which it comes.

A memorial floral design from the greenhouses of our lamented florist and friend, Mr. John Suttle, of Grand Rapids, and arranged by Mr. Turner, was beautiful beyond comparison, and as exhibiting in its emblematic representations Faith, Hope and Charity, is a fitting tribute to the memory of him whom we lament, and who leaves with the State Pomological Society a grateful remembrance of his staunch friendship.

Committee—Wm. Rowe, Grand Rapids; Mrs. L. E. Thayer, Lansing; Mrs. Dr. Nims, Jackson.

VICK'S SPECIAL PREMIUMS.

Collection of Cut Flowers—H. Dale Adams, Galesburg, first premium, \$20; Mrs. R. M. Cook, Charlotte, second premium, \$10; Mrs. W. K. Gibson, Jackson, third premium, \$5; Miss Nellie C. Jenkins, Jackson, fourth premium, floral chromo.

Ornamental Floral Work, either Bouquet or Floral Ornament—Mrs. J. Par-ton Owen, Adrian, \$5.

The committee wish to add that the competition between Mr. Adams and Mrs. Cook was very close, but the collection of the latter contained a few inferior grown specimens, while the collection of the former contained nothing but superior material. The display in this division was very beautiful and well

placed for exhibition. The committee, under the instructions of Mr. Vick, do not hesitate to award the maximum amount of premiums.

Committee—Wm. Rowe, Grand Rapids; Mrs. Dr. Nims, Jackson; Mrs. L. E. Thayer, Lansing; Mrs. S. Blanchard, Tecumseh, George Taylor, Kalamazoo; Mrs. A. J. Gould, Jackson; Mrs. Austin Blair, Jackson.

MEETINGS OF THE EXECUTIVE COMMITTEE AT THE STATE FAIR.

September 17th, 1877.

The Executive Committee met at the Hibbard House—Messrs. Lyon, Chilson, Reynolds, Adams, and Garfield present. On motion, a regular meeting of the committee was appointed at the boarding house of Mr. Shipman, each evening at 7 o'clock.

In relation to the appointment of Viewing Committees, the Secretary said he had taken the liberty to write to some parties regarding committee work and had received favorable replies.

On motion of Mr. Adams, the Superintendents of Fruit and flowers were instructed to select committees in the divisions under their charge.

On motion, Mr. E. F. Guild was appointed Superintendent of Flowers and Miss Adams Assistant Superintendent of Flowers.

On motion, the Superintendents were instructed to tell the members of the Viewing Committees that discretionary premiums might be awarded,—each premium not to exceed half a dollar,—subject, always, to the approval of the Executive Committee.

On motion of Mr. Adams, Horticultural Societies were allowed to make entries of general fruit exhibits, and for the most worthy exhibit of this character the Diploma of our society should be the award. Adjourned.

September 18th.

A motion to restrict exhibitors of single plates to the growers of the fruit in competition, was lost.

Messrs. Bidelman and Chilson were chosen to take into consideration the feasibility of having a general meeting of fruit-growers on some evening during the Fair, and if thought best, secure a room for such purpose. Adjourned.

September 19th.

The Chairman of Finance Committee was instructed to sell the paper plates that are on the hands of the society, to any buyer at such price as he sees fit to put upon them.

On motion, Mr. Chilson was appointed to make inquiries about plates for the use of this society at the annual expositions, and report with samples at the annual meeting in December.

On motion, Messrs. Chilson, Bidelman and Garfield, were appointed to draft resolutions in memory of the late John Suttle.

A motion was made to allow Mr. Bogue's exhibit of fruit grown in New York to compete for our premiums. Motion lost.

On motion, the committee on individual plates of apples, were limited in Class 51,—“Any other valuable variety,”—to six first, six second, and six third premiums.

On motion, the interpretation given to the reading in similar classes in divisions F, G, H and J, was made to include but one first and one second premium in each class.

It was decided to view the entries of designs for Diplomas at ten o'clock Thursday, and the Calvert Company were invited to have a representative present with the design that is in their hands, for the purpose of giving advice regarding the comparative expense of lithographing the designs entered.

On motion, the rule regarding the removal of things on exhibition in force by the Agricultural Society be adopted to govern our exhibitors, with the restriction that by permission of the Superintendent in charge, material may be withdrawn from Pomological Hall previous to Friday noon. Adjourned.

Thursday, Sept. 20.

Report of the Treasurer received, and several appeals adjusted.

On motion, Messrs. Adams, Chilson, and Bidelman were appointed to draft a plan of a hall for the exhibition of fruits and flowers, with all the internal and external arrangements complete, and report the same at the annual meeting.

Mr. Chilson suggested that in planning the next premium list an assistant superintendent be appointed for each division, and that this assistant be responsible for the committee work in that division.

After a careful examination, on motion, the designs entered for diploma were all rejected. The matter of choosing a design was referred by motion back to the Diploma Committee, with certain suggestions regarding Mrs. Baker's entry.

Adjourned.

IN MEMORY OF JOHN SUTTLE OF GRAND RAPIDS.

A special committee reported the following statement and resolutions which were adopted by the Executive Committee of the Michigan State Pomological Society :

The death of Mr. John Suttle, one of our oldest and most esteemed members, which occurred September 13th, 1877, comes to us with a sad import, for he has from the organization of the Society taken a deep interest in our work and influence, and has in many ways given material aid toward the promotion of the best interests of the society.

He was a florist of ingenuity and ability, and aside from building up a business which in itself tended to educate and correct the good taste of the community in which he lived, he was ever ready to impart his knowledge to those who were younger and of less experience. He was one of the few who took hold of the Pomological Society for the good it would do, and appeared at the exhibitions with his beautiful plants and flowers to promote a deeper interest in horticulture, rather than for any profit that might accrue to himself. For his generous attitude we shall ever be indebted to his family. In the midst of his zealous work and generous usefulness he has been suddenly taken away, leaving a great many friends to mourn his loss, and remember his kindness. As representatives of the Michigan Pomological Society we desire to express our feelings regarding Mr. Suttle to the family he has left. Therefore, be it

Resolved, That as a Society we deeply lament the death of our friend and co-worker Mr. John Suttle, and tender our heartfelt sympathy to the family who mourn his loss.

Resolved, As a mark of our respect for our deceased friend, that this action be published in our annual report for 1877, and that copies be furnished the Michigan Farmer and Grand Rapids papers for publication.

Resolved, That the Secretary of our Society be and is hereby instructed to present a copy of these resolutions to the bereaved family.

THE DECEMBER MEETING.

EIGHTH ANNUAL MEETING OF THE SOCIETY—WITH FULL ACCOUNT OF DISCUSSIONS, PAPERS, ADDRESSES, Etc., Etc.

HELD DECEMBER 4TH, 5TH, AND 6TH, AT LUCE'S HALL, GRAND RAPIDS.

The annual meeting at Grand Rapids was called to order promptly at two o'clock in the afternoon of December 4th, with a good audience, among which were to be seen faces of fruit men from every quarter of the State, and before the meeting adjourned there were present seventy-five delegates from abroad.

The meeting was called at Grand Rapids at the request of the Grand River Valley Horticultural Society, and everything was done by that association, in the choice of a hall, arrangements for display of fruit, flowers, and plants, and in the entertainment of members from abroad, that could be to ensure a pleasant, harmonious, and instructive gathering.

After the meeting was called to order the Secretary read letters from a number of the Vice Presidents and others interested in the Society, a few of which are inserted here:

WHERE TO EXPERIMENT.

FROM BENJAMIN HATHAWAY, LITTLE PRAIRIE RONDE.

I am interested in the deliberations of your meeting, and in as much as I can not be present will send a few notes upon my own work.

I have not for the last four years done the usual amount of experimental work. I have 150 to 200 seedling raspberries, some of which in the canes are very promising. They will be in bearing the coming season, and if any should prove valuable you will hear from them. They were grown from seed of the Thornless, Philadelphia, and Mammoth Cluster.

In regard to the most promising field for horticultural experiment, it is so large a domain that it is difficult to determine. I think, however, that it is in the production of new varieties from seed by careful selection by men who have the capacity to discover and cling to the true line of improvement and who have persistence to carry the experiments to a successful issue.

I have much faith in the thinning of fruit as tending toward the equalization of productiveness, or, in other words, I believe that judicious thinning will develop a tendency to fruit every season. The same end may in a measure be attained by judicious pruning, and it is more generally practiced, probably, than the work of thinning. Pruning can be done and probably will be done ten

times where thinning will be attempted once. Either from my thorough pruning or other cause not apparent, I have always been what is called "fortunate" in having a fair crop of apples in seasons of comparative failure. This year I had as many apples as last year, and as usual the majority were Northern Spys.

CRANBERRY CULTURE IN MICHIGAN.

FROM S. H. COMINGS, OF ST. JOSEPH.

It not being convenient to attend your meeting, I send a can of cranberries picked from a natural cranberry marsh I am improving near this place. I would also call the attention of the society to the importance of the cultivation of this fruit in our State, where I suppose there is a large amount of land exactly adapted to this branch of horticulture. In Wisconsin it is becoming a very large interest, one grower having this year gathered a crop of over 6,000 barrels on about 200 acres of land, which has not cost over \$25 per acre to improve, and they are worth \$8 per barrel at his place. Several others have crops of 2,000 to 4,000 barrels. The only serious obstacle in Wisconsin is the danger from frost, which I suppose would be less likely to trouble in this State, and the "fruit belt" on the west shore is certainly free from this danger.

I have spent the past four years superintending the improvement of a large cranberry farm in Jackson county, Wisconsin, which yielded its first crop of about 200 barrels this year, and would have had three or four times as many but for frost. The samples I send you are of the "Bell or Bugle" variety, and are very superior berries as to size, flavor, and keeping qualities. They are the natural variety growing on the large natural marsh of 200 acres which I selected in this vicinity from its possessing in a very perfect degree all the conditions for cranberry culture. It is within one-half mile of the lake, which renders it absolutely free from danger of frost, and the water supply and depth of soil are all that could be asked. I shall be pleased to answer any questions or give any information I can on this matter for the benefit of any members of your society, as I wish to see this interest developed in the State. I have been acquainted with many of the most successful growers of this fruit both east and west, and have been familiar with the *modus operandi* of the business, reasons of success and failure in many places, and can say that I believe the west can excel the east in this as far as in growing wheat or corn, from its better soil and climate.

The keeping and shipping qualities of the western berries are far superior to those grown east, and I have known 40 acres in a body to yield 200 bushels per acre; and on my own land here I this year picked at the rate of 450 bushels per acre. From the limited amount of land well adapted to the cranberry I believe there is no danger of over-stocking the market.

CASS COUNTY FRUIT GROWING.

FROM B. G. BUEL, LITTLE PRAIRIE RONDE.

It would afford me much pleasure to be able to be with you at the meeting next month, but my business is such that I see no possible show for leaving home at that time.

Most of the time for several weeks past the weather has been stormy, and during the last week a snow storm.

Good many good orchards of apples in our county, but the line of successful peach-growing seems to be north of us.

We have quite a goodly number of intelligent fruit men in the central and southern portions of our county, but I have seen no account of their having taken any active part in the State Pomological Society.

If some of those *live fruit committees* were to take a trip of observation among us it might be the means of awakening our staid old Burghers to their benefit, and also to that of the society.

REPORT FROM LENAWEЕ COUNTY.

FROM S. B. MANN.

ADRIAN, Mich., Nov. 28th, 1877.

At a late meeting of the Lenawee County Farmers' Club, I took the liberty to ask questions of the farmers present relative to the fruit crop of 1877, and from their answers I have condensed about the following report:

The apple crop of this county has been not more than fifteen per cent of the average crop of one year with another.

This small quantity is still less valuable from its having to withstand the attack of the increased swarms of insects consequent upon the great crop of last year.

Scarcely one apple in ten was fit for packing, and what few were gathered and put away for winter use are already showing signs of rapid decay. However, I am pleased to report that from the very earnest efforts of a few men there was gathered and shown on the fruit stands, at our county fair, a fine display of apples—very little less in quantity and apparent quality than is shown on ordinary fruit seasons.

The peach crop of this county is confined to one or two small sections and what there were this year would not go above ten per cent of the usual crop. Lenawee county is not a peach-growing county.

Pears have been much better, averaging fifty per cent of the usual crop. These, however, have been raised by comparatively few farmers. The blight is a severe trouble here. Quinces will average with pears very nearly. The plum is a failure from year to year, with one or two exceptions. That precious fruit has come to be looked upon as foreign fruit.

Grapes have been a perfect success this year, far above the average in quantity and quality. Many tons of the finest varieties were marketed in this city alone.

Most of the small fruits were less than the average crop. Some few, however, were above the average.

The currant worm has got fairly installed now, and this year has made sorry looking work. The fruit buds are said to be by the best judges in a fine condition for this time of the year, and the prospect bids fair for an abundant crop in 1878.

It may not be out of order to say that there never was a finer show of vegetables at any of the many county fairs held in this county than was on exhibition this fall, showing conclusively that the farmers and gardeners are awake on this important branch of agriculture.

CROSS-BREEDING GRAPES.

The Secretary had addressed a letter of inquiry to Mr. George Haskell to ascertain his success in cross-breeding grapes, to which he read the following reply:

IPSWICH, Mass., Nov. 15, 1877.

Mr. Chas. W. Garfield:

DEAR SIR—Your letter has come to hand. I comply with your request with pleasure, and mail a few copies of my pamphlet to you for your use and distribution. That will give you some indication as to my success, for all that I have stated therein as to the qualities of the vines and fruits is correct, but is not the whole truth, for I feared if I stated their merits as strongly as they deserve it would excite distrust of all my statements.

The quality of several of these fruits is *very superior*. Indeed, from ten of my best grapes I can select one or more equal to any foreign grape for the table in any one desired quality: in tenderness of flesh equal to the Chasselas, in size and beauty of berry equal to the Black Hamburg, in flavor equal to the Frontignan, and in sweetness superior to either of them. I understand what I am saying, and that I am saying it to intelligent gentlemen. I know what I affirm. But, most of these ten, though not later than the Catawba, are too late to ripen here in the open air, though they have fruited and ripened finely in a cold house, and they are well worth growing in that manner.

A few of them are here subject somewhat to mildew, which is another objection to them, although the vines have lived and prospered here in the open air for ten or more years.

There are others on the list that are tolerably good in quality, early, and very healthy and productive in vine, and that may be valuable where other varieties will not succeed.

There are, also, several varieties from the cross with the Frost or Pigeon Grape (of the Clinton class), which have very strong and healthy vines, medium berries, very large clusters, and which may prove valuable for wine resembling port.

My success, as you see, has not been complete, and I am now crossing and planting in the hope of getting the best fruit to ripen early and resist mildew. I shall probably keep at it as long as I live, but as I must die sometime I cannot promise ultimate success in all I strive for. I hope to live long enough to see my labors appreciated—compensated in other ways I do not expect to be.

I will only add that the vines sent to Tennessee last spring were sold to the University of East Tennessee, at Knoxville. I am informed that several would have borne fruit this season, but it was not allowed: that the vines are entirely healthy, and have grown wonderfully. President Humes has expressly stated that I might refer enquirers about them to him, but I have not done it publicly as I did not like to trouble the officers of the University with such correspondence. But if the officers of your society, or the Faculty of your Agricultural College desire to know more about the growth, appearance and healthiness of the vines, I have no doubt President Humes would be pleased to give the information.

Very truly yours,

GEORGE HASKELL.

GEO. W. CAMPBELL'S OPINION OF THE NEWER GRAPES.

In compliance with your request I will give you my opinion, as based upon experience in this locality, and upon careful comparison with older and well-known sorts of some of the newer introductions of grapes. If I knew what particular varieties would come under discussion at your meeting, I would confine my remarks to them; but as I do not know this I will speak only of such as appear to me most promising at the present time. The period is within my remembrance when the Catawba and Isabella were the only grapes generally known to cultivators; these were followed by the Diana and Clinton, and until the appearance of the Delaware nothing remarkable was introduced. Although the Delaware grape has its faults, and cannot be grown successfully in all localities, it has taken its place as a standard variety, and has attained a reputation for high flavor and superior quality unsurpassed by any other native grape. In its season I think it is now the most popular grape in the large eastern markets, and where it can be grown successfully, is still extensively planted. The Concord, which subsequently appeared, perhaps awakened more discussion and controversy as to its merits than any grape that had preceded it. Its faults, however, which are many, were so far overbalanced by its rugged hardiness, health, productiveness, and general adaptability to all locations at all suited to grape-growing, that it has taken the very highest position in public estimation, and is now more extensively planted than any other variety in the Union. This has always seemed strange to me, for I believe no one regards it as above second or third rate in quality as a table grape, it is rated no higher for wine making, it is too tender-skinned for shipping safely to distant markets; and can be kept in good condition but a very short time after being gathered.

Further remarks upon the older varieties are hardly desirable within the limits of this letter; and I have spoken of them mainly for the purpose of comparison with the newer kinds which will be hereafter mentioned.

Much credit is due to those men who have been for many years striving to produce improved varieties of grapes by the alluring and interesting process of hybridizing or crossing our hardy natives with the finer foreign varieties, the most prominent among whom are Messrs. Allen, Rogers, Moore, Underhill, and Ricketts. All these gentlemen have produced new varieties of grapes, some of which are of great beauty and excellence; but so far as tested up to the present time, none have proved sufficiently hardy, healthy, and productive to supplant the Concord, or to attain a very extensive popularity. I am not at all certain that some of these hybrid grapes do not deserve greater popularity than they have yet obtained, and I think it highly probable that many of them will be found suited to special localities, even though they may not be adapted to general or universal cultivation, and I regard it by no means improbable that there may be among the hybrids, or crosses between hybrids and our best and hardiest natives, new varieties that will be of improved quality, and at the same time be as hardy, healthy, and productive as the most popular older ones. One trouble is, that there are too many new grapes, especially among the hybrids, and with too little difference in character. One or two new varieties having decided and prominent character, showing a marked and distinct improvement upon the older sorts, would be of more practical value than any number of varieties that might be new and good, but not appreciably better than those already grown. A grape having all the better characteristics of the Concord with the fine quality of Catawba, Iona, or Delaware; or a Delaware with more

vigorous growth, and healthy foliage; or a Catawba with less tendency to rot, and earlier ripening, would be at once recognized as improvements of the most important and valuable character. Among Mr. Allen's hybrids, the one which bears his name as Allen's White Hybrid is all that has ever attained any popularity. It is a white grape of really fine quality, and though still planted as an amateur and garden variety, has too much of the foreign element in its constitution in the way of tenderness in winter, and liability to mildew of the foliage to be valuable for general vineyard planting.

While these remarks are applicable to hybrid varieties as a class, there are some among Mr. Rogers' introductions that have better foliage and hardier constitutions than Allen's, and they appear to be in many places gaining in popularity. Among Mr. Rogers' hybrids those which have succeeded best in my locality, and which seem to me as hardy and healthy as either the Catawba or Isabella, of which I give both name and number where they have received names, are Massasoit No. 3, which is the earliest; ripening a few days before Concord, a red grape of good quality, but a little foxy when fully ripe. No. 4 or Wilder; a large black grape, not foxy, and of quality even better than Concord. No. 5, not otherwise named; a red grape of very good quality, and fine flavor without foxiness, and I think worthy more extensive trial than it has received. No. 9, or Lindley; another red grape, medium-sized berry, but large and handsome bunch; quite productive and regarded by some growers as nearly equal to the Delaware. No. 15 or Agawam; a very large Catawba-colored grape of peculiar flavor, quite productive, and very showy, in flavor not to my taste, but one of the most popular of Mr. Rogers' grapes. No. 19, or Merri-mac is much like Wilder, but a little later in ripening, and rather smaller clusters, but with very large berries. No. 30 does not seem to have been generally known, or much planted, but in flavor and quality the finest of all Mr. Rogers' hybrids that I have seen. From a somewhat limited experience, I can only say that I regard it as certainly worthy of trial, and one of the most promising for value of all the hybrid grapes I have yet tested. Salem, which was formerly No. 53, and also at one time known as No. 22, is another of Mr. Rogers' hybrids of very good quality, and has been more highly commended perhaps than any of the others, has not, with me, proven as healthy in foliage, nor as hardy as the others above described.

Mr. Moore originated the Diana Hamburg, which has never met with much favor. The Brighton, however, which is a cross of Diana Hamburg with Concord, seems much more promising. It seems a productive and strong-growing grape, with abundant foliage, and as free from mildew as any of Mr. Rogers' Hybrids; color much like Catawba, bunches and berries a little smaller; flavor good, certainly better than Concord, and time of ripening perhaps a little earlier. It is pretty thoroughly introduced, and its value will soon be determined by the people.

To Mr. Underhill we are indebted for the Croton and Senasqua, which have been for some years before the public. The Croton is a delightful white grape, and the vine a strong grower; the bunches are large and handsome, and for the garden, and for careful amateur culture it is a desirable variety. It is, however, too tender in some winters without protection, and the foliage too much inclined to mildew for vineyard culture. Senasqua is a large black grape, with fine, compact bunches, and a very high, rich and sprightly flavor when well ripened. It is also hardier than the Croton, and with much better foliage. With me, certainly as healthy as the Catawba, and I should expect

this grape to succeed fully as well as the Catawba in vineyard culture, and to be valuable both as a fine table grape, and for wine. It ripens a little later than Concord.

Irving, a large and fine white grape, has also impressed me very favorably, and is in habit of growth much like Senasqua. Black Eagle, is another of Mr. Underhill's hybrids of extra fine quality, and seemingly as hardy, healthy and productive as any of the hybrids; and ripens as early as the Delaware. All these are grapes of higher character than the most of Rogers' Hybrids, and well worthy attention and careful trial.

Mr. Ricketts has exhibited for many years a most extraordinary collection of hybrid grapes, the most varied in character, the most extensive in number, and as a whole, probably the finest in quality of any yet produced. As grown by himself, at Newburgh, on the Hudson River, they are really beautiful, and many of them of extraordinary excellence. They are not yet in market; and although there is no reason to suppose they will differ in habits of growth from other hybrid varieties, the fact that Mr. Ricketts himself grows and exhibits these grapes year after year in wonderful perfection, proves that they *can* be grown by others who may have favorable locations and who will bestow the requisite care; and it is certainly worth the care and attention of any lover of the grape to produce such fruit as he yearly exhibits. If there are successes, and valuable results to be obtained from persistent effort in hybridizing the grape, I believe they will be obtained by the efforts of such enthusiasts as Mr. Ricketts. With a brief notice of the most promising seedlings of native origin, and recent introduction, I will close this paper, already extended beyond my intention.

Since the introduction of the Concord, nearly all the new varieties that seem promising to be of permanent value have been seedlings from this grape, or some of its kindred. The Martha, a white grape, grown by Samuel Miller, many years ago, has some good qualities, and seems to retain considerable popularity in many places, on account of its color, for quality, and general health and hardiness of vine and foliage; in these respects closely resembling its parent Concord. It is, however, smaller in size, and not as productive as the Concord; but with me it has been less liable to rot in unfavorable seasons. And although it is more foxy in flavor, especially before it is fully matured, I think most persons consider it a better table grape than the Concord.

The Eva is another white grape of the same parentage, by the same grower, and originated at the same time with the Martha. While they have many points of resemblance, Eva has been pronounced the better grape; less foxy, finer flavored, with rather larger bunches, and of a little different color, being even when fully ripe, of a light green, instead of a pale yellow, which is the color of the Martha when perfectly ripened in the sunlight. The two varieties are however so nearly alike in all respects, that it is hard to point out the difference. The Eva has also been quite free from rot, and apparently more hardy in severe winters than either the Martha or Concord—and is a little late in ripening.

Belvidere, is another variety which originated in Belvidere, Ill., and was brought to notice by Dr. Lake, of that place. I judge from its appearance that it is a seedling either from Concord or Hartford. It is a very hardy and healthy vine, very productive, bearing very large and handsome clusters, black in color, in quality but little better than the Hartford, but ripening a few days earlier. It has also the fault of falling from the stems easily, when over-ripe.

Its chief recommendation is earliness; being in several respects an improvement upon the Hartford Prolific.

Worden's Seedling is doubtless another Concord seedling, having much the same habit of growth and foliage. It is, however, distinct in flavor, very large in bunch and berry, black in color, ripening fully as early as Hartford, and does not seem disposed to fall from the stem. A promising market grape, valuable for earliness, health, hardiness, fine appearance, and fair quality.

The Lady Grape is also a new, white Concord seedling, healthy, very hardy, and productive. Also of fair size both in bunch and berry, ripening from the middle to the last of August, and altogether the best of all the Concord seedlings I have ever seen; and as far as I know, the best very early grape yet introduced. It ripens from two to three weeks earlier than the Concord, is harder in severe winters, purer and more delicate in flavor, and it may be classed as a very decided improvement upon its popular parent. After several years' fruiting, and careful observation under the most trying circumstances, I confidently recommend it as second to no variety I have ever grown for the most general and extensive cultivation.

Moore's Early is another Concord seedling, specimens of which I have seen at Boston, and at Baltimore at exhibitions of the American Pomological Society. It appears to be two weeks or so earlier than the Concord, and is a very large and showy grape. I thought it rather better flavored than Concord, but others thought it not as good. The vine seems vigorous and healthy, purely of the Concord type, but has not fruited here.

The Elvira, a white grape from Missouri, is a seedling from the Taylor, or Bullitt grape, and of wholly different character from any of the before described. It is a vigorous and most rampant grower, exceedingly productive, foliage very little inclined to mildew, and vine very hardy in winter. It has the peculiar flavor of its parent the Taylor in some degree, but is a grape of better character and flavor, as well as larger in size both in bunch and berry. It has been carefully tested in Michigan, and pronounced as a very valuable grape for making a white wine, and will no doubt become quite popular on that account. It ripens about the same time as the Concord.

The Janesville is another early black grape having the merit of being both very early, very hardy, generally healthy and productive. It is only of medium size, and not better than Hartford in quality. It is however earlier, and does not fall easily from the bunch. For northern locations it would have value as a very early ripening, hardy grape, notwithstanding its inferior quality. There are a few other kinds, of more or less merit—but those I have named are in my location most promising, and most worthy of attention.

I will conclude by saying, that as the result of many years' experience and observation, I believe that hybridizing the grape will produce varieties of fine quality, and of a character nearly if not quite equal to the finer foreign sorts; but this fine quality is to a considerable degree at the expense of that hardness of constitution necessary to withstand our variable and rigorous climate; and though these hybrids are exceedingly interesting and valuable for amateur culturists, and specially favorable localities, we must look to native seedlings or use native crosses for popular sorts suited to the wants of the people for universal cultivation.

Delaware, Ohio, Dec. 1, 1877.

SHIPMENTS OF FRUIT FROM BERRIEN COUNTY.

FROM JOHN WHITTLESEY.

I enclose herewith an account of fruit shipments from this county which will perhaps give an approximate idea of our capacity:

By water:	
Barrels apples.....	55,882
Half bushel crates strawberries.....	128,840
Half bushel crates raspberries.....	40,771
Half bushel crates blackberries.....	14,876
Half bushel crates cherries.....	6,945
Quarter bushel baskets grapes.....	43,563
Third bushel cases grapes.....	5,731
Quarter bushel baskets quinces.....	700
Baskets peaches.....	422,225
Add for various kinds of fruits shipped in baskets and not classified...	6,000

The above does not include railroad shipments, except St. Joseph and Benton Harbor, of which there were a large amount from small stations along the railroad near here, nor does it include any estimate of large quantities of peaches taken to Indiana by wagons.

By railroad:	
Baskets peaches, pears, and grapes.....	65,333
Crates berries.....	25,478
Barrels apples.....	8,038

ORAL REPORTS OF VICE PRESIDENTS.

In addition to the above and other correspondence read, there were given by the following vice presidents reports from their respective counties:

H. B. Chapman, Hillsdale county.—The fruit crop of our county was light; still, some orchards produced well, and there was a considerable shipment made from Reading. Plums, pears, and cherries gave an average yield, and peaches up to the maximum for our inland county. The people of our vicinity do not take the interest in the work of our Society they ought, still, I find the annual reports are gladly welcomed to our midst. Since I was first elected vice president I have secured three life members and a few annual members, but it needs a session of the Society to awaken us to the benefits of the organization.

J. W. Humphrey, Plymouth, Wayne county.—The apple crop for our county was what I denominate a failure. My Northern Spy trees gave good promise until one-third grown, when they nearly all dropped off. All other sorts failed to even blossom, a very few orchards in this vicinity had from one-fourth to one-third of a crop, but they were orchards not in the habit of bearing regularly. Apple trees have made a fine growth, and ripened the wood I think very well, and bid fair next year to give us a good crop. I know of but one peach orchard in Wayne county, that had a paying crop, about four miles from my place. Small fruits were abundant. I am trying to work up the membership interest in this vicinity.

J. Satterlee, Greenville, Montcalm county.—Three-fourths of our county is still very new, and not much is expected of us, still I can see a growing interest

in the culture of fruit, as the timber is taken off, and the fields are fitted for orchard setting. Our crop of apples was meagre the past season, but I see no reason why we may not have a full crop next year. We need to know more of the best methods of management, and the volumes of this society distributed in our midst will aid us to a more rapid progress in the culture of fruits. We are pretty well supplied with wild fruits in our county—there is usually an abundance of blackberries, raspberries and huckleberries, which help to fill the place of cultivated varieties until our lands are more developed.

D. T. Fox, Kalamazoo.—The apple crop of our county was not one-fourth of what we would like to use up, say nothing about shipments. We do not like to be thus limited in our supply, and it is not often that our orchards deal with us so sparingly. We had a full crop of cherries, and wherever there were peach trees, that fruit was abundant; just a moderate crop of pears, and small fruits were abundant. Fruit trees have made a good growth of wood this season, and it is well ripened. There are a good many young peach orchards that under favorable circumstances will furnish a good crop next season. We are getting into the belief in our county that we can raise plums, and by the jarring process preserve the fruit from the ravages of the curculio,—it is not so much work after all, if only attended to in the proper time and manner.

A. G. Gulley, South Haven, Van Buren county.—I have very little to report beyond what is generally known of us. We had a plenty of peaches and grapes, pears, and small fruits, and there is a general tendency to increase the area of orcharding. A great many peach trees are going to be set another spring, and our people are thoroughly imbued with the idea that there is a reasonable profit in growing fruit, and with little chance of failure if well attended to.

Mr. Dutton, Holland, Ottawa county.—Our people raise a good deal of fruit, particularly apples and peaches; but they do not take the interest in progressive fruit-growing that they should, and do not look enough to excellent quality. The codling moth nearly destroyed what few apples we had this season, and no measures whatever are taken to lessen its ravages.

N. Chilson, Battle Creek, Calhoun county.—The fruit crop with us was a substantial failure, as in other portions of the State; but we never had a better show at our county fair. The people came out with what little they had, and from this I believe our people are alive in the matter of fruit culture.

P. D. Sneathen, Ionia county.—I had no expectation of making a report, but can say that for eleven years we have not had so short a crop of apples. The prospects good for another year, except peaches, and, if we have a mild winter, they are all right; but the peach wood is not well ripened, and a temperature slightly lower than ordinary winter weather will probably injure our peach crop materially in all but the most favored locations.

Mr. Hanford, Bristol, Indiana.—I have the misfortune to live just over the Indiana line, but I am interested in this society, and calculate to be identified with its work. Beyond the usual account of fruit prospects, I have to say that we raise the Snyder blackberry, and believe in it because it is hardy and we can depend on it. In strawberries we are certainly progressing beyond the Wilson. The Monarch of the West is the berry with us. We can just as well raise 200 bushels of these berries as 50 bushels of corn, and the soil may be no richer or better prepared in the one case than in the other. Lime has been used in our orchards,—some of them,—and has certainly been efficacious in freeing these orchards from the extensive ravages of the codling moth. The lime

is thrown through the trees several times during the season, in a powdered state, at a cost of $2\frac{1}{4}$ cents per tree. I have no theory about the matter, but can cite a number of instances where the results have been all that could be asked for. This was Dr. Hull's plan, and, although I do not know the philosophy of it, I still have a good deal of confidence in the results produced by practicing it.

Mr. Buell, Kalamazoo.—How large are the apples when the first application is made?

Mr. Hanford.—The practice with us is to make the first use of the lime retty soon after the trees are out of blossom.

Mr. Chapman.—How is the lime applied?

Mr. Hanford.—We take it with the hand and sow it among the branches of the trees. I suppose a bellows might be effectually employed, but I never have seen it used for this purpose. I have just a word to add about Mr. Campbell's letter on grapes. He is not favorably located for the ripening of varieties that are rather late for our season, and writes me that he never has succeeded in ripening the Catawba or Isabella, so his opinion in this direction will be very safe to follow. I was very much pleased with his estimate of the newer kinds of grapes.

The first topic for discussion was:

METHODS OF EXHIBITING FRUITS.

Mr. Chilson.—I was expected to open this discussion and present some samples of plates that have been promised me, but as they are not here, I prefer that Prof. Beal should occupy my time, as I see he has samples, etc., to illustrate what he may say.

Prof. W. J. Beal.—The subject is a very interesting one to me, and since attending the last fair, I consider it of the greatest importance to our society, for there is little satisfaction in either exhibiting or examining fruit put up as ours was at the Jackson fair. If our fruit is taken to expositions largely for purposes of instruction, and if our annual exhibitions are to be largely educational in their objects, I urge that some progress be made in methods of showing samples. I have samples of plates, clasps, and cards as used by the Massachusetts Horticultural Society, which I have brought from our museum at the college. The plates are of white stone ware, as you will see, quadrilateral in shape, the proportion of length to width being as three to four, the edges are raised very slightly and there is no waste space when numbers are placed along together. I need not mention the necessity of having card so fixed to each plate of fruit as to be a permanent fixture. With the card giving name, exhibitor, and locality laid loosely upon the plates, a gust of air or sweep of clothing will remove it never to be returned, and if people are allowed to pick up cards, as they were at our last fair, there is no surety that they will replace the tickets where they belong, and varieties get hopelessly mixed to any except experts, and no information is given except the owner or exhibitor of the fruit is at hand to answer all inquiries. Again, committee men cannot do their duty without cards are fixed to the plates where they belong. I show you here clasps with cards slipped into them that I trust our Society will examine, and if thought desirable, secure. The brass ones come at \$3.00 per gross, nickel plate \$5.00, and Japan plate at \$3.75 per gross. In the Massachusetts Horticultural Society, cards with name stamped thereon are furnished the principal exhibitors.

and turned standards having larger cards placed on them are employed to designate the locality of varieties. I have one suggestion further to make regarding the plan of our annual exhibition, and that is that the classes be separated by evergreen or colored paper, so that the committees will have no trouble in deciding just how far a collection or class extends. This is exceedingly important in cases of collections from counties, towns, or individuals.

Mr. Lyon.—I found there was no limit to the removal of cards from plates last season, and our Society is the only one that I know of that has a permanent committee on nomenclature, to secure the proper naming of fruits on exhibition: but their work is rendered nugatory unless some method is adopted for making the labels a permanent fixture where they are placed. Again, I am satisfied we must make some move toward the use of something in the place of our pasteboard plates now on hand. I labored under a false impression when negotiations were making for them, for I understood they were to be made of this stiff paper ware that is made to withstand water, and was quite chagrined to find we were to use the ordinary grocers' pasteboard butter-plates. I trust some change will be consummated before another fair.

Mr. Chilson.—I have a word now to put in, by way of suggestion, as to management in connection with the exhibits. It is all-important that our committee work be simplified as much as possible; and to this end not only must all entries coming in competition be placed together, but the committee must know exactly all the details of arrangement in their division. I suggest, therefore, if it is proper in this connection, that there be one superintendent of fruits, and an assistant superintendent for each division, and that this assistant be expected to do all the arranging in his or her division, and finally act as chairman of the viewing committee. We shall thus accomplish several objects: 1st, The fruit will be well displayed; 2d, Justice will be done both the exhibitors and those who come to see; 3d, There will be ample opportunity for specialists who desire to learn all they can at the fair to take hold of a division in which they may be peculiarly interested and get a great deal of information out of the experience in handling the fruit.

Mr. E. Buell, Kalamazoo.—This society is recommended to the fruit growers of Michigan as a light to their pathway; but unless there is a better exhibition of light than there was at the Jackson fair, we shall not expect much of it in future. I never saw so dark a hall in which to exhibit fruit. It was difficult to distinguish varieties that were quite dissimilar, saying nothing of those that nearly resembled each other. There the fruit was placed on a poor quality of pasteboard plates, as unfit for the purpose as a rag is in place of a window-pane, and, worst of all, the entire exhibit was placed upon a set of stairs too narrow for the plates. I was induced to serve on committees, and before I had made any progress whatever, pronounced the whole plan a fraud, and have not yet had reason to change my opinion. I favor the purchase, as soon as practicable, of good substantial plates and securing some means of permanently attaching cards upon which shall be written the name of the fruit, the locality of its growth, and the name of the exhibitor.

Secretary Garfield.—Give us your substitution for the stairs.

Mr. Buell.—I would substitute flat tables low enough to admit of every one's seeing each plate of fruit without stretching their necks out of joint, and I would have the light fall upon the fruit as directly as possible to give at least a truthful idea of form and color.

Mr. Lyon.—At the centennial the same difficulty of shelving had to be over-

come. At first the fruit was displayed upon stairs, and was found to be in poor arrangement for both exhibitors and awarding committees. I understand, however, that after I left, tables were employed to much better advantage. I would give as my opinion that a hall for fruit should be so arranged as to admit of a line of tables through the center, and if arranged on the sides there should not be more than a rise of one step so that the fruit should not be placed on more than two levels.

Mr. Stearns, Kalamazoo.—I have had some experience in exhibiting grapes on flat tables with no plates whatever, and in no other way can I make so perfect a display. The tables if arranged so as to have the plane of the exhibit on a slight incline, perhaps would be a little improved. But if covered with neat white paper, and the grapes are nicely arranged, there is no way they can be placed for effect that will be so complete. I can see no decided objection to the showing of other fruits in the same manner.

Prof. Beal.—The gentleman will see by the samples of plates which I have, and that are in use by eastern societies, that the edge is as slight as possible, so that in the use of them there will be all the advantages of Mr. Stearns' system with, perhaps, an added one by having a slight ridge to separate the varieties. These plates being rectangular when placed in close proximity cover the whole surface of the table.

Mr. Lyon.—I can see a decided objection to the exhibition of fruit by Mr. Stearns' plan in the danger of mixing varieties. With the tendency to roll that apples have, it would be almost impossible to prevent chaos in a table of ordinary stability.

Mr. Stearns.—I think Mr. Lyon's point is well taken, perhaps, on apples and similar fruit, but with grapes there is no danger of this kind, and when arranged so as to have as much immediate contrast of color as possible there is no difficulty in detecting sorts.

Mr. E. H. Reynolds, Monroe.—I have brought up some samples of galvanized wire plates that are light, durable and cheap—my own invention while trying to find a solution for the problem we are now discussing. The objection that may be brought against these samples may be in the form which is round, but I apprehend no difficulty in making them square.

Mr. Lyon.—I suppose the same thing may be said of tin plates, they can be as easily made rectangular as round, and thus the space upon tables will be more effectually utilized, and this is an important point, for if we are to show upon flat tables we shall require more horizontal space than we have ordinarily needed.

Mr. Chilson.—I have some Japan plates (which were subsequently exhibited) made by a firm in Chicago, that can be purchased for \$50 or \$60 per thousand that are very neat, durable, and we would have no difficulty from breakage. They are round, but can be made rectangular, and please me very much. Here are also some samples of earthen plates made by a firm in Jackson. They are quite neat, but are heavy to transport from place to place, as we must do.

Mr. Buell.—I see a decided objection to anything that is not white. All kinds of fruit show better upon a white surface. If a man spends a week in getting fruit together, and takes the cream of his possessions to the fair, it is but just that the most complete provision be made for him to exhibit the perfections of his entries, and I hope this society will bear in mind the significance of this fact. I pray you, do not invest in anything that you will immediately regret.

Prof. Beal.—Could we not have tin painted white?

Mr. Chilson.—A matter of the most importance to us in making a selection of material for plates is the fact that we are not permanently located, and we must have something that can be easily boxed up and transported every alternate year from one part of the State to another with no danger from breakage.

Mr. Fuller, Grand Rapids.—I should suppose that enameled sheet-iron ware that is so popular nowadays would come within the means of this society and meet the purposes of exhibition and transportation, nicely. I suggest that the committee in charge of this matter investigate in this direction.

The whole matter was referred to the executive committee for final decision, and the next item on the programme was called for,—an essay by Mr. Edward Bradfield, of Ada. Topic,

MY FAILURES IN GRAPE GROWING.

To the President and members of the State Pomological Society:

Previous to the last meeting of the Society, your Secretary requested me to write a paper on my failures and mistakes in grape growing. I have done so now, and the most interesting feature to you will be its shortness.

My first failure was trying to grow three or four of the then best varieties of American grapes on Clinton vines. About twelve years ago I paid a nurseryman in Kent county eight dollars for one dozen grape vines. The proprietor dug them up and labelled them in my presence,—three Delawares, three Dianas, three Concords, and three Clintons. They were carefully planted in a trench that had been excavated four feet deep and three feet wide, and were trained on a trellis on the southeast side of my house, yet with all this care not one of these vines could be induced to bear any but Clinton grapes, or, what this conscientious man called them afterward, “Blue Delawares.” He has since “left this country, for his country’s good.”

The following year the foundation was laid for a worse failure, when I paid an honest tree and vine peddler, living in Grand Rapids, ten dollars for one dozen grape vines, four were to be Delaware, four Diana, and four Concord, all warranted true to name, but when these vines fruited nine proved to be Clinton and three Catawba, the latter, for my locality, being worse than Clinton. A sufficient recommendation for this honest tree peddler is that he took up in sight of my house several hundred apple trees, stacked them, not vertically, with their roots on the ground, but horizontally like cord wood, left them thus exposed to the sun and drying wind of April five or six days, then returned, packed them in boxes with wet straw, and shipped them to Wisconsin. It is useless to call his name, as he is deaf to remonstrances. I think it would not be so easy in this eighth year of the Pomological Society for any two gentlemen to palm off on any member Delaware grape vines bearing blue grapes.

My first mistake on a larger scale was planting too many varieties, some forty or fifty, instead of confining myself, as I should have done, to ten or fifteen, at most.

The next was growing and laying down two opposite arms where rows ran up and down hill, as the ascending arm robbed the descending one of a portion of its sap, thus throwing the vine out of balance. Another defect in this sys-

tem was the short stock had to be bent over at right angles to lay down the vines, and this could not be done without injury after a few years' growth. As a remedy for both defects the ascending one was cut away, the stock trained at an angle of twenty or thirty and the descending arm extended to fill the space. Another mistake was allowing my Adirondack vines to overbear in 1875 and 1876. On many of the vines that had previously ripened their fruit early in August could be seen unripe grapes in November these years.

Another was, in supposing a miller could make any money by raising grape vines for sale, but after three days' labor last spring, digging, sorting, and tying up in dozen bunches, about 500 two-year-old vines, paying five dollars for advertising, sending a man to Grand Rapids who occupied six days in selling them, and returned with sixteen dollars as the gross receipts for these 500 vines, the miller discovered his mistake, and concluded taking toll was the better business. But the most foolish mistake made by the writer in grape growing was when he supposed he could grow more Concord grapes on a given area of ground or trellis than he could of Ionas.

Mr. Stearns.—I desire to ask one question in connection with this matter of grape growing, and will premise it by saying that my most conspicuous failure recently is in not being able to rid my vines of those little pestiferous fleas known as thrips. The question is, how shall I do it?

Mr. Hanford.—Have you tried sulphur?

Mr. Stearns.—Yes, but with very imperfect success.

Mr. Hanford.—I never have failed with sulphur, but have found that one important point needs to be considered. The temperature of the air should be above 70° in order to be successful, and if a good deal moist all the better.

Mr. Lyon.—Mr. Bidwell at South Haven, who is a man of a good deal of experience in this direction, says that by turning over the leaves in the vineyard after they have fallen in the autumn, is a very effectual way of destroying large numbers of these insects, as they need a little protection which is forbidden them if the leaves under which they hibernate are turned over so as to give the full benefit of exposure.

The second topic for discussion was next announced :

ROTATION OF CROPS IN HORTICULTURE.

Mr. J. N. Stearns.—For years I have been more or less interested in the cultivation of small fruits, and I learned from experience that if one crop of strawberries followed another upon the same field, there was manifest deterioration in the crop. By planting the second stand of strawberries upon the same soil, I noticed the plants seemed to grow pretty well, but the fruit was mostly inferior, and ranked almost entirely as what we denominate "seconds." In the nursery business I am convinced that after taking off a crop of trees it is better that the land be employed for a time in general farming, and given a period of recreation, and perhaps a crop of clover before employing it again for the growing of trees. But where this change of crop is most needed, perhaps it is the most difficult to manage; that is among our small fruit growers, near cities where they have but five, ten, or perhaps twenty acres of land, and every inch of it is used. There is less opportunity for rotation here, but I am satisfied that it will pay all these fruit growers to change off to some other crop from strawberries, and give plenty of manure while the land is not into a strawberry crop.

Thomas Wild, Berlin.—I have had a good deal of experience in raising strawberries, and am satisfied that a single full crop of berries is all that a piece of land will profitably grow, without a period of respite. By this I do not mean entire rest from all crops, but let there be a period of several years in which the soil is employed in growing other crops. I prefer to get the land after strawberries into clover as soon as practicable, and there is nothing that will bring land into shape for a second crop of strawberries like a soil used for pasture, and finally turned under with a good growth above and below ground to be used as a fertilizer. Strawberries are very exhaustive and wheat after them will be a meagre crop generally.

Mr. Hanford.—I am in favor of a rotation of crops not only in farming but in small fruit growing, but I am not in favor of this sort of management to the exclusion of abundant manuring. The fact of the business is, if the rotation be never so skillfully arranged and there is a continuous taking away with no return, it is a pretty hollow affair, and no matter how many years intervene between the same crop as grown upon a piece of land, the soil will be very little better fitted for it than if it followed closely with no rotation. The motto for us all is: Manure in abundance in return for that which we take from the soil.

The President then announced the following committees:

On Fruits—Messrs. Stearns, A. G. Gulley, and J. W. Humphrey.

On Plants and Flowers—Messrs. Geo. Taylor, R. Haigh, Jr., and Mrs. Chapman.

On Resolutions—Hon. J. G. Ramsdell, Prof. W. J. Beal, and C. A. Dutton.

A recess was taken until evening.

MEETING OF THE EXECUTIVE COMMITTEE DEC. 4TH, 1877.

The committee was called to order by President Lyon. Members present,—Messrs. Chilson, Reynolds, Parmelee, and Garfield.

The Secretary called up the matter of a joint exhibition with the State Agricultural Society for 1878.

On motion, it was decided to again exhibit with the State Agricultural Society, provided terms similar to those of 1877 could be agreed upon.

It was thought best, however, to add by some means about \$200 to the premium list.

President Lyon and Secretary Garfield were selected to meet with the executive committee of the State Agricultural Society, and all matters of negotiation were put in their hands with power to act.

On motion, the Secretary was instructed to immediately look after a place in the new capitol in which to preserve our books and records, and to take measures immediately to put the reports on hand where they will be safe.

A resolution of gratitude to Prof. Prescott, of the State University, Byron D. Halsted, of Cambridge, Massachusetts, and Prof. Prentiss, of Cornell University, for articles written for our report of 1877, was unanimously passed.

Mr. Chilson offered the following resolution, which was adopted:

Resolved, That all money in the treasury after paying all demands against the society up to January 1, 1877, be invested in plates, clasps, and cards for the use of the society at its annual expositions, provided that a sum not less than \$50 remain in the hands of the Treasurer for contingent expenses.

On motion, the finance committee were empowered to select and purchase the articles mentioned in the above resolution.

Adjourned.

CHAS. W. GARFIELD,
Secretary.

Tuesday Evening.

Promptly at seven o'clock the Society was called to order, and after Mr. H. B. Chapman had exhibited the Lodge pear and explained some of its peculiar qualities, and the reading of some correspondence, Hon. G. W. Thayer, mayor of Grand Rapids, was introduced and delivered the following appropriate

ADDRESS OF WELCOME:

MR. PRESIDENT, LADIES, AND GENTLEMEN,—When persons of note, charged with the execution of a useful public service, come within our borders, an established custom demands that the importance of their presence should be duly recognized. The impressions that they may carry with them as they go out from among us will depend largely upon the manner of their reception, and the evidences they may have observed of a desire to properly recognize the importance and purposes of their mission.

If they be kindly greeted, if they receive that consideration that their position or the importance of their labors justly entitles them to expect, they are encouraged and strengthened in their work; their capacities for successful labor in their line of duty are increased.

I suppose that measurably for these reasons it has been assigned to me, as the official representative of this city, to present myself before you, and to extend to you, Mr. President, ladies, and gentlemen of the State Pomological Society, a cordial greeting; in its name to bid you welcome, in its name to express to you the hope that your deliberations may conduce to the interest and good of our whole country, for in accomplishing such a result you will best contribute to your own edification and instruction, a wise Providence having ordained that every man who voluntarily makes himself useful to his fellows and contributes to their good in so doing confers a benefit upon himself.

The cultivation and propagation of fruits are destined to become of national interest. The United States have already produced more good and hardy varieties of apples, grapes, and peaches than any other country. They have grown and offered for sale a greater variety of fruits than any other nation, yet the first nurseries for the cultivation and sale of fruit trees in the States were as late as 1798, at which time they numbered only four or five; now they number upward of 600, covering more than half a million of acres, representing more than 2,300 varieties of apples, nearly 1,300 of pears, upward of 300 of peaches, over 200 of cherries, and over 300 each of grapes and strawberries. Yet societies like this, organized to stimulate and encourage the cultivation of choice varieties of fruits, are of very recent origin. The Pilgrims brought over with them in 1620 a few varieties of apples, pears, etc., but the United States and a portion of Mexico are largely indebted for many varieties of their fruit to the Romish monks and missionaries, some of whom penetrated the wilds of Michigan and States west of us, more than two hundred years ago. There are still to be found along the banks of the Detroit River, pear trees brought from France and planted by those missionaries. I have myself seen many of these

trees. I should judge some of them to be from 60 to 80 feet in height, with a diameter of trunk 16 to 24 inches. They are now annually producing from ten to thirty bushels per tree of choice fruit. There they stand, scattered at intervals, like towering sentinels looking into the face of that beautiful river, the only remaining evidence of more than two centuries past and gone, yearly testifying by their abundant fruitage to the thoughtfulness, wisdom, energy, heroism and devotion to duty of a band of noble men, whose total abnegation of self and whose efforts to improve the condition of the savages among whom they came, lived, and died, have, and for ages to come must command the admiration of all who learn their history. Thus have we evidence that he who successfully introduces a choice variety of hardy fruit will confer and perpetuate a blessing to his race that may be more lasting than monuments, or any work of those who live contemporary with him.

I am not sufficiently conversant with the details of organization of this, or of the various local societies in the State, of which I understand this is to be the representative, to be able to know in what its cohesive power consists. I cannot see that for all your expenditure of time and money any adequate compensation can come to you in dollars. Society is filled with organizations, all having relation to the requirements of man in some direction. Those having for their objective point the education and enlightenment of the public concerning those useful things that relate to the general good, are among the most worthy, and ought to be commended and encouraged by all proper means. If I understand the objects and purposes of this society, it presents no negative; no one decries its usefulness; none try to thwart its efforts, for it seeks no results that are antagonistic to any interest; its great work in its broadest sense is to do good! the noblest occupation that God has given to man.

If he who causes a blade of grass to grow where none grew before is a benefactor, greater is he who causes to grow a useful vegetable, a beautiful flower or plant, a fruitful vine or tree, where none grew before, or who increases the variety and improves the quality of such products. The field that is open to us in that direction is broad and expansive, limited only by the possibilities of finite mind.

The most wonderful progress in the arts and sciences made within the last century by all civilized nations, but most especially in our own country, instead of giving, as some suppose, indications of approaching fullness, rather serves to demonstrate to the more intelligent that they only presage the future before us, as the first tints of morning foreshadow the coming day. So long as it shall be possible for man to develop, expand, and improve the higher qualities of his mind, so long will it be possible for him to usefully extend his researches, and lay open and utilize the hidden treasures of nature that so silently, yet so convincingly testify to those who decipher their meaning by the lexicon of truth, to the existence of, and the surpassing wisdom of the Infinite Man, the Creator, whose creation of worlds, even to their remotest ultimates, have relation to the qualities in man and the possibilities of his nature through endless time.

It comes within common observation that the most useful inventions, that the most wonderful discoveries, and the ability to make them of practical use to man, are almost wholly confined to those nations who represent the highest types of civilization. Those, therefore, who apply their energies in that field of labor that excites those qualities of the mind, the development of which

tends to elevate and refine the moral and spiritual condition of man, are nobly employed.

We cultivate flowers, plants, shrubs, and ornamental trees, we make lawns, build conservatories, construct tasty and elegant buildings, decorate and beautify our houses, and do many other things that we might, so far as our physical wants are concerned, leave undone: but they are produced, because they represent the visible outgrowth of certain qualities of the mind, and for these qualities they are food as much as the vegetables and fruits are food for the body, the providing of which gives us not only a greater appreciation of the beautiful, but stimulates the higher faculties to purer thoughts, wiser purposes, and nobler aspirations.

Scan the personal character of those you know, turn the leaves in your book of memory, examine well its pages and tell me how many there are that you have known who have found pleasure in the cultivation of plants and flowers, or, in the scientific departments of horticulture and pomology, who have become human wrecks, who have been an incubus to society and a discredit to humanity? I think you will note that they are occupations not congenial to those who delight to live only on the lower plane of a merely sensual life.

It is a gratifying fact that our Peninsular State occupies no mean position among her sisters in relation to the propagation of fruits. She is the only State that has collected statistics of orchard and fruit culture. The estimated money value of the fruits she annually produces is about \$4,000,000, being one-twelfth of the supposed value of the entire product of the United States.

It is largely owing to the organized effort that this body represents that in this particular Michigan is placed in the enviable position she now occupies. Such is her location, such her climate and soil, that it is possible for your efforts and wisdom soon to place her in the van of all the States.

It is a work worthy of your deliberations and of the countenance and support of every good citizen.

Recognizing the importance of the purposes and uses for which you are convened, again I bid you welcome to the city of the nativity of your organization. May your councils be pleasant and instructive, resulting in the greatest possible good, not only to yourselves personally, but in more widely extending the field of your usefulness.

PRESIDENT LYON'S RESPONSE.

President Lyon responded in a few well chosen remarks, of which we give the following abstract:

I feel very much at a loss, after giving a hasty survey over the broad field opened to our view by the worthy Mayor in his address of welcome, to know just where to begin in my brief reply.

Our society had its origin with your people here at Grand Rapids. Here it received its name, and it was the people of this vicinity that fostered its first efforts to establish the reputation that has come to it through persistent and continuous labor on the part of its members. It took the name of STATE society, and this was considered by many as a very bold assumption, considering that the field of its work was limited to so small an area. But as soon as its strength developed it swung loose from its moorings, and has since been a State society in more than name. To its banner have flocked from every

locality in the State the most intelligent fruit growers, and now we have enrolled a large number of experienced pomologists, who are willing to impart from their storehouses of knowledge, and at the same time are glad to receive the information from others, which our society brings to the front through its quarterly sessions.

Whether it has as fully accomplished the objects you had in view in the organization, as you might desire, remains for you to decide. We can all observe a considerable progress in our endeavor to get hold of the citizenship of the State. But as we look ahead and survey the possibilities of our future it seems but little that we have already accomplished. We shall never reach that point where we can say, we have done our work. The field opens broader to us as we advance into it. Our work increases with our exertions. The art of horticulture and the science which underlies the art (I use the term horticulture rather than pomology, because it is more applicable to our real work) form the very poetry of agriculture. Embodying all the principles of agriculture, we can say that horticulture is more than a branch of the tree, it permeates the whole structure, beautifying and ennobling it.

We come back to you after years of absence, not for the purpose of showing off our capabilities, but the rather to imbibe new strength and vigor from the place of our nativity.

We do not forget that horticulture and commerce in Western Michigan are intimately related, and that while by our efforts we aid in the development of the latter we are giving support to the former. We are not assuming too much, I believe, in saying that we have as a society materially increased the value of investments in Western Michigan, and without any disparagement to other parts of the State, I am free to remark that our work will largely center in the western part of the State, and the major part of our support will come from here.

Let me be understood, then, that while we give no preference to any locality in the State, still where fruit growing makes up the greater part of the occupations of the people, there our influence is the most largely developed.

Trusting that we will find you ready always in the future as in the past to second any worthy enterprise in which we may engage as a society, we put ourselves in your hands for a season, to be encouraged and enlivened for that which is waiting our efforts to accomplish.

The next exercise of the evening was an essay by Mrs. Sophie H. Knight of Lansing, on

THE HARTFORD FERN IN HOME DECORATION.

Another brief, joyous season of buds, blossoms, and foliage has passed away; the frosts of another autumn have browned and dried the leaves, which the cold winds of November have shaken to the ground; soon they will be covered, in their graves, by the snows of winter. We clung, with anxious care, to the few hardy pets of our summer gardens: verbenas, chrysanthemums, and dark-eyed pansies braved the frosts and cold; but, at last, we have bid them also "farewell"—till Spring, with her balmy air and warm sunshine, shall once more woo them to waken from their long sleep. The birds flitted to "summer climes" weeks ago, and now the dismantled flower-beds, "naked woods, and meadows brown and sere" afford only sad and retrospective thoughts; we are therefore glad to turn our attention indoors, and in looking around our warm

and pleasant homes, seek to beautify them in such a manner as to remind us of our summer gardens in which we took so much pleasure. This love of Nature and her works implanted in the human breast, affords us greatest delight in its study, and while *she* is most industrious in adorning *her* domains, we should endeavor to obey her teachings, and seek to adorn our houses with pleasant objects and all the attractions that can make them cheerful. Growing plants, trailing vines, ferns, and mosses (kept in a warm, moist atmosphere, and dampened and sprinkled occasionally) are prominent in home decorations; but there are many who have not the conveniences or time for the care and culture of these and the more tender house plants; to them the ornamentation of the walls of their houses with the beautifully tinted autumn leaves, pressed ferns, and vines has come to be a delightful source of enjoyment and beautification. The ground pine, which grows so abundantly in our Michigan pine woods, has been greatly used for the above purpose in the last two or three years; persons who have seen the Florida mossy vine growing in luxuriance in its own State, have sought to perpetuate its associations by using it in a dried condition for ornamenting picture cords, frames and chandeliers. Southern travelers have described it as hanging in long festoons from the trees, and it is said that in a warm, moist atmosphere it will continue to grow, even when detached from the parent root, and hung upon a wall. But these vines when exposed to the warm, dry air, with a winter fire, gradually sift off in fine, dusty particles, a fact not agreeable to careful, thrifty housekeepers. The climbing Fern, *Lygodium palmatum*—generally known as the Hartford Fern, has none of these objections; and in the words of our friend, Mr. Garfield, “nothing can be more delicately appropriate, in sitting-room or parlor, than this beautiful fern, and to those who have no house-plants, it helps to dispel in winter, thoughts of the barrenness of the season, and is an added increment to the joys of a household.” I have seen it beautifully arranged, as if growing naturally from a vase or jar, the sprays being placed and held in their natural positions by very small tacks, or by slips of paper pasted over the stems, at intervals. It is also a great addition to pictures, when arranged on the cords or frames. A friend, holding dear the memory of a darling little nephew, every winter wreathes his picture with the trailing dark green vine and blossom, so that the sweet face, lovely enough for an ideal, seems looking out from a frame of a seemingly growing wreath of leaves.

It is in fact the most satisfactory and pleasing of all the pressed ferns; and as its peculiar character and history is not generally known, I append a sketch taken from Wingate’s Household Journal, window gardening department:

“The Hartford Fern has been generally known to the public only within four or five years; so desirable for winter decoration, it has been gladly welcomed to numerous homes in all parts of the Union, and has also found its way to Canada, and even across the Atlantic. To many, however, it is still a novelty, and comparatively little is known of its growth and preparation. It is an exceedingly *rare* plant, the only native *climbing* fern in the United States. It grows in isolated patches, in marshy and inaccessible thickets, in the Connecticut Valley, and these patches, are like angels’ visits, ‘few and far between.’ The vine is generally found twisted around small shrubs, or in a tangle of blackberry bushes, from which it must be carefully disengaged. The botanical name, *Lygodium palmatum*, is derived from the Greek, signifying slender, flexible,—and the Latin, *palmatum* meaning *palm*-shape, from the fancied resemblance of the leaf to the human hand. The common names are numer-

ous, among which are trailing, creeping, fairy, climbing, and Hartford Fern; also, fern-ivy and star-vine. The pressed fern was first brought into market by Miss Goodwin, a Hartford lady, who is still engaged in the work. As her business has increased she has associated with her a charming circle of refined young ladies, who, while engaged in preparing the greenery for so many winter homes, are, at the same time, working out one of the problems of woman's work, for work for *women* it emphatically is. Not only is the delicate touch of quick, dainty fingers required to lay in the proper position the leaves, so provokingly inclined to curl, but woman's patience, also, must be called into requisition, for the process is a slow one, especially in a warm, damp autumn, and orders come faster than they can be filled. Some of the ferns offered in the New York market have been pressed with a hot iron, which renders the leaf very brittle, and the color soon fades. The difference between the latter process and that of Miss Goodwin is soon learned." * * *

A letter to a New York paper, in speaking of the various vines for trimming, says: "A year ago smilax was all the rage; men offered it for sale at all the street corners, and ladies purchased it to trim their hair and dresses for parties. It has, however, been superseded by the Hartford Fern. This is now sold along the streets, and the trade is quite lively. For a long time ladies, using the fern, were compelled to press it themselves, but it can now be purchased already pressed. It grows exclusively in Hartford, and in woods in the neighborhood. The people used to tear it up by the roots and sell the plants to outsiders; but it is very difficult to cultivate, and that trade has been discontinued. The quantities that were taken would soon have destroyed it entirely, but a law was passed by the Legislature a few years since, prohibiting people from picking it, except at a certain season, and in prescribed quantities."

I learn from Miss Goodwin that the increasing scarcity of the Fern sometimes necessitates her sending long distances for it: some of her assistants having been as far as seventy miles for it. It is quite safe to add also that most of the packages offered for sale and used to fill orders are prepared by this lady and her assistants. I have made several inquiries concerning the propagation of this plant. In the Botanical Gardens at Washington I found a small vine last fall, and in the greenhouse connected with our Agricultural College I think there is still a specimen in growth. All botanists and gardeners who have made the experiment agree upon the difficulty of its propagation.

The Country Gentleman for February 24, 1876, gives numerous answers to inquirers concerning the botanical name and nature of this Fern. From one we learn that "it derives its name of Hartford Fern from the fact that it was first sold in the streets of that city, the principal portion being gathered and sold by one family at East Windsor Hill, some eight miles from the city. The place of growth in this locality is swampy or wet woodland. It is found in several localities in the State; but is generally considered rare. The stalks spring from slender running root stocks, are slender, flexible, and twining, growing about three feet in height in best specimens: branches alternate, short, with two petioles of considerable length growing therefrom, each petiole bearing a rounded, heart-shaped, palmately 4-7 lobed sterile frondlet, the fertile frondlets growing above on the same plant, forming a terminal panicle. Many unsuccessful attempts have been made to transplant this fern, from this particular locality; but want of success resulted more from making the attempt at the wrong season, than because it may not be successfully done; in fact it has in one instance been successfully started in a new growth." Another correspondent

says: "The fern is a trailing vine, with starlike leaves, having stems an inch long, and about two inches apart on the vine. The fruitage is on an extension of the vine, some twelve inches long, and appears like a fine spray of leaves." Still another answer: "A law has been passed in Connecticut for the protection of this beautiful fern; but this does not prevent large quantities of it being pressed and dried, and sent to all parts of the United States. In Gray's Manual of Botany, the *Lygodium* is mentioned as being found from Massachusetts to Virginia, Kentucky, and southward, though not at all common." By the above we find that the demand for the best and most acceptable means of house adornment, viz.: the arrangement of something that shall take off the bareness of white or pale walls, and that shall harmonize with all pictures, all colors of carpet, curtains, or furniture, has brought, and is still bringing, prominently before the public the beauties of this fern.

It was not my intention to take all the time and space allotted to me for the Hartford Fern. I wished to speak of other ferns and their uses; but doubtless could only add facts and uses already known to yourselves, especially to my lady hearers and readers, who are the ones, generally, to make the subject of house and home decorations *their* study. This is one of *our* missions and we cannot tell how far the influence of even a *small* effort may extend. An acquaintance, one year, just before the holidays, took unusual pains in trimming her parlor and sitting room with autumn leaves (nicely pressed, not varnished) ferns, and Hartford vine (the latter pinned on the lace curtains, in festoons over the top in a very tasteful manner), thus making her rooms delightfully attractive to the eye. They remained all winter; but an early *spring cleaning* necessitated the dismantling of the walls; my friend's husband, an undemonstrative kind of person, who had not manifested any especial admiration of the decorations (being very much engrossed that winter in business), exclaimed, upon seeing the room "put to rights" without the former leafy adornments, "What have you done with the leaves and vines? I have enjoyed them so much, and I could rest and enjoy my reading in these rooms. It doesn't seem *homelike* without the ferns." It is useless to add that, *of course*, the walls were soon trimmed as before, and *remained* so, until replaced with fresher trimmings in the fall, when Mr. B—— proved an active assistant in the gathering and selection of ferns and leaves for pressing.

In conclusion let me add my persuasions to those of far abler powers than mine, that *all*, both young and old, may exert every endeavor to make home as attractive as possible. An untutored eye and uncultivated mind can discern the difference between bare walls and those adorned. Nature, liberal in her gifts, withholds not from the humblest or poorest, but lavishly rewards all who seek her bounty, and all who truly love her.

The essay was illustrated by samples of the fern arranged on the wall so that the audience at the intervals of the meeting could become acquainted with the fern and the method of using it.

The following topic next engaged the attention of the convention.

THE WINTER HOUSE GARDEN.

T. T. Lyon.—In the absence of Mr. W. K. Gibson, who was to open this discussion, I take the liberty to call upon the Secretary, who I trust, will be willing to leave his work at the table, and at least lead us into the discussion.

Secretary Garfield.—My work in this meeting I consider to be to put together the good things said, and place them before the people of Michigan in a way, if possible, to aid in the general improvement of those engaged in horticultural pursuits, and I am in no way prepared to contribute to the primary fund. I had hoped that our worthy president, in the absence of Mr. Gibson, would give us some of his own thoughts upon this topic. I know him to be a keen observer of house plants and their treatment, and more than this to have had no small amount of experience in caring for them, therefore I hesitate to take from my meagre savings when he has such a storehouse to go to. However, I will make a remark or two upon one topic. I am in favor of fostering anything and everything that will make our homes more pleasant and enjoyable, and I believe the work of this Society is not confined to assisting fruit-growers to make more money, but extends to methods of securing a greater amount of satisfied happiness to all who may be willing to adopt into their households cuttings from the great tree of horticulture, and by granting a little fostering care reap a reward that can not be measured by so clumsy a unit as the gold dollar.

To get the greatest amount of satisfaction out of a window garden one needs to love the plants that compose it, and treat them with the same tenderness and generosity that the pets of the household receive, and it is only by studying the habits of each variety that one comes to know how to treat it with the right kind of solicitude. When I look into a house in which the window is filled with well grown plants, I know two things about it; some one there has a keen appreciation of beautiful things and is willing to give heart to the care of one of the most delicate attributes of the home. If this Society can by its influence get the men and boys to appreciate the pleasure that can be obtained from the cultivation of window plants it will do a great deal toward the genuine good that may permeate our homes.

One needs to have some measure of success in beginning anything of this kind to encourage further endeavor, hence I recommend a plan which has proved a success in my own home from the very outset, and will give in detail the plan of a little window garden in which my wife and I take a great deal of delight. We thought to have an aquarium once, and had one made according to the books, out of wood, glass, and putty. It was a very pretty thing, two feet long, and ten inches wide, and perhaps fourteen inches in height. But when the water was put in preparatory to the transfer of the finny specimens, no effort of ours could keep it inside the glass, and after various endeavors we gave it up and concluded to utilize the "box" to some other end. In the bottom of it was put four inches of soil made of three parts good mold, two parts muck, and one part white sand. We bought a bell glass about seven inches in diameter and ten inches high. Made a frame work of wood and wire, placing the glass with open end upward therein and setting the whole in the middle of our "aquarium." In the bell glass was placed a little water plant held down by pieces of gypsum, and then it was filled with water and a couple of fish transferred to it. Several kinds of ferns and lycopods were placed in the earth about the bell glass, and finally some glass fitted in above so as to keep the case approximately air tight and still leave the bell glass open to the air. The whole thing is a perfect success, and is really the most attractive feature of our household. The aquarium cost about five dollars and was a failure. The window garden containing an aquarium, cost less than a dollar, and is all we could ask for. The plants have not been watered in over a month, and the water in the bell glass needs to be changed once every week. Requiring

so little care, an arrangement of this kind commends itself to the beginner in window gardening until he gets into the way of managing plants indoors, when he can attempt something more elaborate.

Prof. Beal.—I am often asked, “what ails my plants?” and the answer in a large share of the instances is, “you are too kind to them.” It is full as easy to drown a plant as to drown a cat, to say the least; and my advice is to give water only when it is needed, and use judgment rather than regularity. The idea that plants must be watered every day anyway is a false one. Give them water when they are thirsty, the same as you would yourself. I am greatly in favor of cultivating ferns because they are so beautiful and seem so well adapted to house culture,—and can endorse all the secretary has said about the adaptability of the Wardian case to window gardening.

Mr. Lyon.—The Wardian case is certainly the most beautiful plan that can be adopted for successfully growing a certain class of plants in the house: but I will put stress upon the class, for the sorts of plants that will succeed in one of these cases are limited to a very few, among which are those the secretary mentioned. With such a case one need not have the constant fear of freezing up that haunts us when we have a lot of plants in the open window, with a wood-fire to regulate the temperature. The glass case gives very perfect protection, and the thermometer may indicate even freezing point without and the case of plants will be perfectly safe.

One fault I commonly notice in the management of house plants, and that is in not checking the tendency to grow a tall, spindling stem. This may be successfully done by pinching the tips from time to time, and it adds materially to the beauty of most plants to make them put on a stocky growth.

Prof. Tracy.—There is one element in the management of plants that neither of these gentlemen have considered, and perhaps it is because they are without experience,—that is the children. I find it necessary to think of them somewhat in the selection of plants for the window, or rather to remember the remarkable tendency that most small children have to “handle things.” In my own experience I find it safest to grow a few large plants rather than to attempt the growing of a great many smaller ones.

We must not forget the cold nights, and unless a window full of plants are well fixed for moving, it is better to have fewer large ones mounted on easters so they can be easily rolled to the middle of the floor. It is very desirable to have flowering plants, and of those that grow large and flower well I wish to mention two that have always done well with me: the *Calla lily* and the *Agapanthus umbellatus*. They are a good deal like the Concord grape, will stand a good deal of neglect and do pretty well.

George Taylor, Kalamazoo.—I agree most heartily with Mr. Tracy that it is better to limit our plants for the winter house-garden to very few varieties. My wife is a great hand for plants and flowers, but has for winter nothing but three varieties of carnations and is never without flowers. With her these plants prove eminently successful, and I think that others who try them will find they are easily cared for, and are as satisfactory as any plant for home culture.

A paper was next read by Prof. W. W. Tracy of Old Mission, Grand Traverse, upon

HORTICULTURE,—YESTERDAY, TO-DAY, AND TO-MORROW.

In comparing the horticulture of the past and present, we assume that the best presentation of the horticultural knowledge and skill of the period is to be found in the current standard works on the subject. These, however, are so voluminous that the time of the entire session would be insufficient for the fair consideration of even those of the past.

As Michigan pomologists are most particularly interested in the apple, that king of fruits which has found in our beautiful Peninsula State so congenial a home, we will take the culture of the apple in orchards as a type of the entire range of horticultural subjects, and ask your attention first to the following directions for such culture, taken from an English book published about one hundred and twenty years ago: "All the sorts of apples are propagated by grafting or budding upon the stocks of the same kind, for they will not take upon any other sorts of fruit trees. There are three sorts of stocks generally used; the first are called free, and are raised from the kernels of all sorts of apples indifferently. But I should always prefer such stocks as are raised from the kernels of crabs, because they will continue longer sound and will preserve some of the best sorts of apples in their true size, color, and flavor, whereas the other free stocks produce larger fruit which are not so well tasted, nor will keep so long, and I find several of the old writers on this subject of the same mind. Mr. Austin, who wrote an hundred years ago says 'the stock which he counts best for apple grafts is the crab, which is better than a winter apple tree to graft on because they are usually free from canker, and will become very large trees, and I conceive will last longer than stocks of sweeter apples, and will make fruits more strong and hardy to endure frosts.'"

(How does this, written over two hundred and twenty years ago, accord with a recent advertisement headed "A New Departure," and which says "that at last it has been discovered by careful experiment that apple grafts on crab stocks are so much hardier than the most tender varieties so worked will become iron-clads capable of enduring the most severe northwestern winter?")

"In the management of the nursery we should observe the following rules:

"1st. That the soil in which you make the nursery be not better than that where the trees are to be planted out for good. The not observing this is the reason that trees are often at a stand or make but little progress for three or four years after they come from the nursery. Trees that are raised upon the soil, and in the same degree of warmth, where they are to be planted will succeed much better than those brought from a greater distance and from a richer soil.

"2d. This ground ought to be fresh, and not such as has already been worn out by trees or other large growing plants.

"3d. It ought not to be too wet, nor over dry, but rather of a middling nature, although of the two extremes dry is to be preferred, because in such soils though the trees do not make so great a progress as in moist, yet they are generally sounder and more disposed to fruitfulness.

"The method of raising stocks from the kernels of crabs is to procure them where they are pressed for cider, and after they are cleaned of the pulp they may be sown upon a bed of light earth, covering them over one half inch thick with the same earth. They may be sown in November or December, when the ground is dry, but in wet it will be best to defer sowing until February, but

then the seed should be preserved in dry sand. In the Spring when the plants begin to appear they must be carefully weeded, and during the summer they must be constantly cultivated and kept clear from weeds, which if suffered to grow will soon overtop the plants and spoil their growth. If they thrive well, they will be fit to transplant the October following, at which time the ground should be carefully digged and cleaned from the roots of all bad weeds. Then the stocks should be planted in rows, three feet asunder, and the plants one foot distant in the row. They should by no means be headed back, which would weaken them and cause them to produce lateral branches. In taking the stocks out of the seed-bed you must raise the ground with a spade in order to preserve the roots as entire as possible, then with your knife you should prune off all the very small fibres, and if there are any that have a tendency to shoot downright, the tap root must be shortened in order to force out horizontal roots. In the summer season you must always observe to hoe and destroy the weeds, and in succeeding years you should observe to dig up the ground every spring between the rows. You should also observe when any of the stocks have shot out lateral branches to prune them off that they may be encouraged to grow straight and smooth. The stocks intended for standards will require three years' growth before they will be fit to graft, when they will be upwards of six feet high."

Very full and complete directions for grafting, by approach in the rind, by cleft and whip-grafting, are given; but as they differ in no particular from those of modern writers, I will not take time to quote them, except the following rules for the directions of scions:

"1st. That they should be shoots of the former year, for when they are older they never succeed well.

"2d. Always to take them from healthy, fruitful trees, for if the trees are sickly from whence they are taken the grafts very often partake so much of the distemper as rarely to get the better of it, at least for some years, and when they are taken from young, luxuriant trees, whose vessels are generally large, they will continue to produce luxuriant shoots, and are seldom so fertile as those taken from fruitful trees whose shoots are more compact, and the joints closer together; at least it will be a much greater number of years before these luxuriant grafts begin to produce fruit.

"3d. You should prefer those grafts which are taken from the lateral branches to those from strong perpendicular shoots, for the reasons before given."

After the trees have had two years' growth from the graft, they are to be set in orchard, on the situation and soil for which the author has the following:

"The best situation for an orchard is on the ascent of gentle hills, facing the south or southeast; but this ascent must not be too steep. There are many persons who prefer low situations at the foot of hills, but I am thoroughly convinced, from experience, that all bottoms, where there are hills on every side, are very improper for this purpose, for the air is drawn down in strong currents, which, being pent in on every side, renders these bottoms much colder than the open situations, and during the winter and spring these bottoms are very unhealthy to all vegetables; therefore, the gentle rise of a hill, fully exposed to the sun and air, is by much the best situation.

"As to the soil a gentle, hazel loam which is easy to work, and which does not detain the wet, is the best, for although these trees will grow upon very strong land, yet they are seldom so thriving, nor are their fruits so well flavored as

those which grow on a gentle soil, and on the other hand these trees will not do well on a very dry gravel or sand. The ground intended to be planted should be well prepared the year before by plowing it thoroughly, for the earth cannot be too much wrought or pulverized for this purpose. The distance which these trees should be planted, where the soil is good, must be fifty or sixty feet, and where the soil is not so good, forty feet may be sufficient, but nothing can be of worse consequence than the crowding trees too close together in orchards. The planting should be as soon as possible performed, when the trees begin to shed their leaves, when they are taken up all the small fibres should be entirely cut off from their roots, which if left on will turn mouldy and decay, so will obstruct new fibres in their growth. The extreme parts of roots must be shortened, and all bruised or broken roots cut off, and if there are any misplaced roots, which cross each other, they should also be cut away. In pruning their heads, little more is necessary than to cut out such branches as are ill-placed, or that cross each other, for I do not approve the heading of them down, as is by some often practiced, to the loss of many of their trees. In the planting there must be care taken not to place the roots too deep in the ground, especially if the ground is moist, but rather raise them on a little hill. When the trees are planted they should be staked to prevent their being shaken or blown out of the ground by strong winds, but in doing of this there should be particular care taken to put either straw, hay-bands or woollen cloth between the trees and the stakes to prevent the trees from being rubbed or bruised by the shaking against the stakes. If the winter should prove very severe it will be proper to cover the surface of the ground about their roots to prevent the frosts from penetrating it and injuring their young fibres. It will be the best way to keep the land in tillage, for by constant plowing or digging of the ground the roots of the tree will be encouraged, and they will make the more progress in their growth. But the crops should not be planted too near the trees lest the nourishment should be drawn away from them, and in the plowing of the ground there must be care taken not to go too near the stems of the trees, whereby their roots would be injured or the bark of their stems rubbed off.

“In pruning of orchard trees nothing more should be done but to cut out all those branches which cross each other, and if left would rub and tear off the bark, as also decayed branches; but never shorten any of their shoots. If suckers or shoots from their stems should come out they must be entirely taken off, and when any branches are broken by the wind they should be cut off either down to the division of the branch or close to the stem which produced it. The best time for this work is in November, for it should not be done in frosty weather nor in spring when the sap begins to be in motion. The best method to keep apples for winter use is to let them hang upon the trees until there is danger of frost, to gather them in dry weather, and then lay them in large heaps to sweat for three weeks or a month. Afterwards look them over carefully, taking out all such as have appearance of decay, wiping all the sound fruit dry, and pack them up in large oil-jars which have been thoroughly scalded and dry, stopping them down close to exclude the external air. If this is duly observed the fruit will keep sound a long time and their flesh will be plump, for when they are exposed to the air their skins will shrink and their pulp will be soft.”

These directions are compiled from the articles on *Malus*, Nurseries, and Grafting, occupying some 20 pages of Miller's Garden Dictionary, published in

1754 in three volumes, one of which I hold in my hand. It professes to "contain the methods of cultivating and improving all sorts of trees, plants and flowers for the kitchen, fruit and pleasure-garden, as also those which are used in medicine, with directions for the culture of vineyards and making of wine in England, in which likewise are included the practical parts of Husbandry."

I am sorry that my limited library prevents my comparing this work with a modern English one of the same general character, but I am sure I cannot be accused of unfairness to modern horticultural literature if I compare apple-culture as presented in this general work with the subject as treated in the 1870 edition of "Downing's Fruit and Fruit Trees of America."

All my hearers are so familiar with the work that it would be simply a waste of time to make long quotations from it, so I will only refer to the space assigned to the different subjects and point out any new principles of culture and management, in which the two authors differ.

Of the 1000 pages of the work 372 are devoted to the apple, all but twelve of which are occupied with descriptions of varieties. It would be hardly fair to confine the comparison to these 12 pages, as the preceeding 58 are devoted to general principles, which are intended to apply to the apple as well as to other fruits. Our comparison then will be with the first 50 pages of "Downing."

Chapter I., of ten pages, is on the production of new varieties, and in it Van Mon's method, and that by cross-breeding are well and clearly presented. Miller seems to have known nothing of either; he certainly makes no mention of any systematic method for the production of new varieties, but says "All sorts of fruit originate accidentally from kernels which, when planted, sport into new kinds."

Chapter II., of 5 pages, considers the durations of varieties. Here Knight's theory that a variety will not maintain a healthy existence beyond the time that the original seedling would have naturally lived is presented, and I think, disproved. So Downing occupies the same position in this respect as Miller, who says "by this means (grafting) we may continue to increase a variety forever, no matter how soon the first tree of the sort shall die."

Chapter III., of 18 pages, is given to the propagation of varieties. The first difference we detect here is that Downing recommends scions from the thrifty, upright shoots near the center because they will grow more rapidly, while Miller condemns these, and prefers scions from the lower horizontal limbs because they will produce fruit earlier and more abundantly. Next we have the practice of root-grafting described, but not recommended. Downing seems to have fallen more into the use of grafting-wax instead of clay, although Miller describes it and recommends its use. The next two chapters of eleven pages are on "Pruning and Training." Although Downing treats this subject more fully, I can find nothing that is not suggested at least by Miller, except the entire subject of root-pruning, of which he makes no mention.

He makes some remarks on the utility of pruning that are so applicable to the present day that I quote them here. "There is not any part of gardening which is of more general use than that of pruning, and yet it is very rare to see fruit trees skillfully managed; almost every gardener will pretend to be a master of this business, though there are but few who rightly understand it; nor is it to be learned by rote, but requires a strict observation of the different manners of growth of the several sorts of fruit trees, some requiring to be managed one way, and others must be treated in quite a different method, which is only to be known from carefully observing how each kind is naturally disposed

to produce its fruit." Our next chapter is on "Transplanting," which is not spoken of separately at all by Miller, but here is the first place where I find an absolute difference of practice between the two authors. Downing recommends to take up the trees so as to save as many as possible of the small and delicate fibers. Miller, on the other hand, while recommending to secure all the roots possible, directs that these small fibers should be cut off. Both authors disapprove of much cutting back of the top.

Chap. VII., on "Soil and Aspect," presents nothing different than what is scattered through Miller, but he has nothing to correspond to Chap. VIII. on "Insects," nor can I find that he makes any mention of insects, worms, or bugs, although the apple worm must have been known, for in a book published thirty years before, I find it is recommended to set a candle in each tree to destroy the moths which produce these worms.

Chap. IX. is given to the special consideration of the apple, but I can find but little difference between the two authors; both want good, well-drained soils, thoroughly prepared by deep culture before setting the trees. That the trees should be well set, and thoroughly cultivated in fallow crops until they come into bearing. Both disapprove of much pruning after the trees have come into bearing. The only difference I can find between them is that Downing says "Grafting is usually done when the stock is about one-half inch in diameter," while Miller wishes the stocks to grow to be five or six feet high. [May not this difference account for Miller's preferring the scions from the first bearing, while Downing prefers those from the leaf-bearing branches of the trees?] Downing says the trees should be set thirty or forty, Miller, fifty or sixty feet apart. These we believe are the only essential points of difference. To sum up then the important difference of the two authors as the net gain of the century, we have—

1st. The introduction of systematic efforts to originate new varieties, the result of which is a vast increase in the number and perhaps in the quality, of varieties in cultivation.

2d. Some difference in practice, in selection of scions, and in age and size of stocks for grafting, in which we think the older author nearer right.

3d. Root-pruning, to induce fruitfulness.

4th. Difference in practice in paring off small fibres at transplanting, and in view of the tendency to regard the fibres as annuals, it is quite possible that the older practice is the correct one.

5th. Systematic warfare against insect enemies. Of these, the most important are the production of new varieties, and destruction of insects. Now, I think that the credit of the first belongs, really, to the botanist, who, in the course of his scientific investigations, discovered the sexual character of the blossoms, and I am sure that the credit of the insect warfare belongs not to the orchardist, but to the entomologist, *that crack-brained chap who rushes bare-headed across the field after a little gray miller*, when practical men are busy at work that amounts to something. Throwing out these, or even giving, if you choose, all the credit to the horticulturist, isn't it rather a poor showing for a body of men, who boast of exceptional intelligence, to make for the century that has seen other human occupations go forward with such gigantic strides? Cannot we say of horticulture as the Irishman did of his sick wife, "Faith, but she gets no better very steady?" If we have gained so little in the past, what can we hope in the future? Before attempting to answer let us look for a moment at the horticultural history of the typical pomologist of to-day.

For some reason, perhaps the setting out or purchase of an orchard, he becomes interested in fruit-culture, and sets about to learn something of the subject. He purchases a fruit book or two, perhaps Downing, with his 850 pages devoted to the description of varieties, and only a hundred and fifty to the discussion, use, and culture of all sorts of fruits, including melons, and subscribes for one or two horticultural papers. The first walk he takes in his orchard a dozen questions spring up in regard to its growth and management.

He refers to his fruit book, but in vain; the point is not discussed at all. He waits the visit of some horticultural friends, and propounds the question to them, and none can answer that they know, though each gives a different opinion. His faith in their horticultural knowledge is shaken; he asks a friend, "Is A much of a fruit man?" "Why, yes, he is one of the best posted men on varieties of apples there is in the State." In this way, sooner or later, he learns that all that is expected of a fruit-man, or of a fruit-book, for that matter, is to give a novice those general directions for the management of his trees that have been known and practiced for ages, and which common sense alone would suggest, and to know the greatest possible number of varieties, and that none of them know much more than can be readily seen in regard to plant-growth. Soon he drops all questions that trouble him into the category of "those things that no fellow can find out"—and effects a familiar superiority to fruit books now never referred to except to identify a variety, and the horticultural articles in his papers, because they are evidently for beginners. As he is a constant attendant at horticultural meetings, he is elected to some office, and forthwith he is known as one of the prominent fruit men of the State. And *he* is a fair representative of a body of men who boast of their exceptional intelligence and the elevating character of their profession. There is not one of us that can answer many more of the questions in regard to the growth of trees that an intelligent boy would ask, than could our ancestors 100 years ago. We have gained an entry into the vestibule of Pomona's temple, and instead of crowding on up the long flight of steps to where she sits ready to reveal the wonderful beauties hidden beyond, we lean back in our chairs, and, looking about, say, one to another, "Wonderous fine building this! splendid ceiling! Isn't this a pleasant company we have here? Ain't we smart to have got in?" How can we expect to advance under such circumstances? How can we expect that Pomona will come down and drag us into her hall? There is no royal road even to horticultural learning, and here, as everywhere, we must labor if we would know wisdom.

If we continue in this indolent intellectual condition the next generation will have to take up the work just where we did, and there will be no possibility of advancement. What we need is first to rid our minds of the idea that the hidden mysteries of plant-growth are past finding out, and go about day by day carefully observing and comparing all phenomena that will aid us in solving them. I have been told that were we to go into friend Ilgenfritz's nursery and cut 20 sticks of buds of as many different varieties, bring them in and throw them on the table before him, he would correctly name nineteen of the twenty. Now I believe that the same observation and study which has enabled him to do this, would if so applied, solve many of the questions that now perplex us, and it is just this kind of observation we want. Secondly, we must study the results of experiments and observations of others as presented in our horticultural papers. You answer we do not find them there, the papers all seem prepared especially for beginners. Very well, then write the results of your own obser-

uations. It is wonderful how it improves the tone of a paper if he but becomes a contributor. No one feels the public pulse more keenly than the editor, and as long as we read the horticultural column very much as we do the letters from Washington by our own correspondent, or the short story on the back page, so long will they fail to be worth reading in any other way. Let it once be known that we are in dead earnest in knowing something more than is now known of our profession, and we will soon have aids enough. There is not a publisher in the country that would to-day risk his money in starting a paper for horticulturists, in which the space would be occupied by reports of experiments and matters pertaining to the solution of some of questions we now ignore, and so long as there is not enthusiasm enough among all the thousands of horticulturists of this country to support such a paper, so long will horticulture as a science stand just where it has for the last century or more.

You ask, who will make these experiments and write these articles? I answer, the men must be developed. One great need of horticulture to-day is scientific enthusiasts, men who study horticultural facts not that they may get a dollar out of them, but as Prof. Cook studies a bug, not for the good it may do, nor for the evil, but just for the pure bug there is in him. We constantly hear the cry, we want practical men,—meaning men who can make money. I am tired of it. We want enthusiastic *students*. The practical man never leaves the world the wiser for his having lived in it. It was not Cornell and Orton, but Morse and Field that advanced telegraphy. Which left the world the richer, Isaac Rich, who made his millions handling fresh fish and oysters, or Prof. Agassiz, who spent his life in studying them, and was too busy to make money? My friends, we have a noble calling. Let us not degrade it by seeking only success in dollars and cents, but give heart and soul to the worship of Pomona, and never cease for a moment to importune her with questions, until she reveals her secrets to us, and let us not allow our day and generation to slip by without giving to the world the solution of some of the questions we asked when a boy.

The last discussion of the evening was based upon the question

HOW SHALL WE PRESERVE OURSELVES FROM THE WILES OF THE FRUIT TREE AGENT?

Judge Ramsdell.—A discussion to be lively and entertaining should, it seems to me, have more than one side to it, and to this tree agent swindling business there is but one view to take, and as I look at it all must agree with me, to be safe the only way to do is to let tree agents severely alone. How the secretary should have known that I had been defrauded, and should have selected me to tell my story first in this discussion I cannot imagine, but he has certainly struck right, for I have had my share of tribulation as a result of too implicit confidence in a tree agent. Several years ago, I bought of a tree canvasser pear trees in variety, selecting just what I wanted, and “they could be furnished, O yes, no question about that, just according to order.” The trees were delivered and paid for, and I was fortunate enough to make most of them grow. They came into bearing and you know our Traverse region is a great country to work changes in fruits. The best pomologists are often at fault in naming our varieties because of the wonderful difference in appearance that comes as a result of our soil, climate, etc. Well, the metamorphosis that my carefully

selected varieties underwent was perfectly astonishing. Among other changes I found my *Virgaliens* turned out to be Stevens' Genesee, my Winter Nêhs were very good Buffams, and my Vicars answered the exact description of *Beurré Diel*. Probably this last change was an improvement. My Clapp's Favorite trees, that I had doted on, grew Onondaga fruit. But strange to say with one-half of Bartlett trees there seemed to be no such remarkable change. I recognized the fruit as the Bartlett at once, and I conclude that this particular pear is not so easily influenced by change of climate.

Not a great while ago a fellow came into our country selling trees that purported to come from a nursery near Adrian. It was astonishing, however, what a variety of stock that nursery produced, for the agent could sell anything a man wanted and deliver it true to name, and I am free to say he lived up to contract if the labels on his trees were any index. But to the sorrow of our people we found that his stock was purchased at wholesale, and consisted of anything he could get for the least money, and his principal stock in trade was labels and lead pencils, which he employed regardless of expense in billing his trees out to customers.

I am satisfied from my own experience that it is perfectly fair for us to consider the average tree agent a swindler. But in the face of this remark I wish to say that we are blessed with a man up in our region who has been selling trees of late, in whom we have a good deal of confidence. He takes a continuous interest in every orchard of trees he sells, assisting in planting and coming around afterwards to make suggestions as to further management. To be sure none of his trees have been set long enough to test his veracity and honesty, but he seems to be a rare exception to the general run of agents.

A. G. Gulley.—We need to consider these tree agents under at least two heads,—

1. Authorized agents from nurseries;
2. Agents sent out by dealers.

The first class are as reliable as the nursery itself generally. They are paid by the month for selling what is in the nursery and nothing else.

On the other hand the dealers and their agents sell anything and everything, running the risk of buying it of some nurseryman. This last class always sell good trees, but as a rule pay very little attention to the naming of varieties correctly. They fill orders with nice thrifty trees because these take well on the start, and at the same time can be purchased for the least money at the nursery. To illustrate how little honesty there is in this class: I know a man who in dealing with an agent wanted some small young ornamental trees to ornament his lot, and not knowing much of such matters, trusted largely to the agent's judgment, who recommended tree peonies as just the thing, and you who know what tree peonies are can well understand his righteous indignation when he found his lot surrounded by these plants.

Another of these irresponsible dealers sold a man 30 Tree Roses, to be delivered in the fall. Now, Tree Roses are very costly things,—mostly imported,—and no one who knows anything of them would want to risk trying more than one or two. But the agent cracked them up to be the finest things ever known; would grow in any clime, and be a joy forever. In the fall it is difficult to find these in the hands of any nurseryman. This dealer, not finding them on hand, proposed to substitute Double Flowering Thorn, a fine shrub, but quite common, and costing, perhaps, one-tenth as much as Tree Roses. These were dug and furnished him, and he was thinking what a neat thing he had done,

and what a nice little profit he was going to pocket, when he happened to espy the little Euonymus, sometimes called Strawberry Tree, which is sold at about one-fourth what the Thorns had cost him. He made the exchange at once, and I suppose delivered these shrubs that cost him next to nothing, taking five dollars apiece for them, and pocketing the whole thing.

But in the face of these examples I do not hesitate to say that there are a great many honest, straight-forward agents of nurseries, and nurserymen, as a rule, are honest, if for no other reason, because it is a good policy.

My own advice, based upon a considerable experience with nurserymen, is to deal directly with well established nurserymen. It is better to have them near at hand, but if there is any question as to the correct naming of varieties, it is better to go farther away, for I have no sympathy with those who cry that trees are injured by traveling some distance, provided, always, that they are rightly handled by the nurserymen.

Prof. Tracy.—I am sorry to say that a good deal of the swindling is done by the people who buy. They swindle themselves. As an instance of this, when I was working in a nursery at Geneva, our firm put out a catalogue in which was a fine plate of the common Peony; only its botanical name was attached,—*Peonea Officinalis*. A lady out west who was overrun with the "common pinies," saw the plate and decided to get this new variety, and wrote to the firm, ordering several specimens of this "new variety," as she called it. Of course, when it bloomed, she was disappointed, but her mistake was not the fault of the nurseryman, but was due to her own lack of information. The tree agent goes into a new country and takes advantage of this ignorance and cheats the people.

Mr. Fox, Kalamazoo.—There are some honorable exceptions to these swindlers, for one sold me a bill of trees, and when he delivered them he actually told me that he could not obtain all the varieties I ordered, and made in one or two cases substitutions, which he named. I have more confidence in the profession since this instance.

Mr. Steele, Elk Rapids.—I must lay on the blows hard, for I can not express my abhorrence for the men who will go into our new country where the settlers have all they can do to obtain food and clothing for their families, and by showing up the advantages to accrue from a growing orchard induce the poor people to squeeze a little harder and buy a few trees, and all this for a lot of worthless stuff that never will give any return. It is a shame that such men are allowed to pray upon the people. They ought to be tarred and feathered—yes, exterminated. I have no patience with the semblance of men who are so lost to all honor or sympathy. Where you have an occasional case of this kind in your old settled parts of the State, we have dozens of them. They have made our country a sort of stamping ground. As some one has said before me, we have one notable exception to this, a man who is selling trees in our country, who seems not afraid to remain there. He gives advice about planting, and even assists in the work, and follows up closely the orchards of trees he has sold, and seems anxious to have them thrive and come into early bearing. As a result of this he is "a big gun" among the settlers, and is becoming immensely popular. I call up this instance as a hint to our friends here who are interested in the nursery business.

J. N. Stearns.—We should get rid of a good deal of this imposture spoken of if the people could only be educated to know that all varieties of trees can not be grown straight and nice, and that the buyers must not expect straight

Greenings and Roxbury Russets, or thrifty Red Canadas and Peck's Pleasants. The people too often expect splendid trees, no matter what kinds they order, and in order to please them at first sight the agents err in the direction of deceit.

Mr. Munson, Grand Rapids.—The temptation comes to the agents because of the ignorance of the people. When people learn to know that some kinds of trees cannot be grown straight and beautiful like others, they will not expect the dealer to furnish nice trees regardless of varieties ordered. As regards the want of responsibility on the part of agents, I should have the agent show his credentials before purchasing.

Prof. Tracy.—Two things it is well to consider before purchasing:

1st. What trees to buy;

2d. To buy only of responsible nurserymen.

I manage this last point by giving the agent my order on condition that I shall send it directly to the nursery he represents. In this way one gets rid of imposters pretty easily.

S. L. Fuller.—What to buy, where to buy, and when to buy, are questions the people are every day receiving information upon through the efforts of this Society. It is a work of education that this organization was founded to carry on, and I am glad to hear this discussion. I have done a good deal of begging for this Society, and have always offered the inducement that for every dollar expended value received would be given in valuable information. I have occasionally found a hard case, and have learned from experience to tackle the elderly men. The young fellows know too much. I remember one instance: a young man was perfectly independent of our deliberations; I asked him to join our Society, and said to him, "You will have a farm some day and will set out an orchard; you will then want to know what fruit trees to buy. The volume I give you for your membership will give you the exact information you will want." "Yes," said he, "but that thing is fixed; I am going to marry a widow that has got a farm!" "Well," said I, "how about the kinds of apples you are going to plant?" "I think I will take all Seek-no-further!" said he, as he turned upon his heel. So, you see, this educating the masses is rather up-hill work; but I am not discouraged.

Mr. Scott, Grand Rapids.—I am satisfied some nurserymen need educating in honesty as well as tree-dealers. I can from experience endorse all that has been said about the swindling propensities; but for the benefit of the nurserymen present I wish to say that the worst piece of cheating that was ever accomplished, to which I was the worsted party, had a nurseryman at the other end. I was not going to trust a dealer, nor would I even send to the nursery, but went myself and selected vines for a good sized graper. They were labeled Concord and Delaware, but proved in time to be all Catawba. I dug them all up, but as if to throw my folly into my face, the miserable things have sprouted from the roots and I have Catawba vines for sale, and he who gets them will find them correctly labeled. So, gentlemen, my experience—and I am an old man—has been that agents will cheat you, but nurserymen will make the cleanest job of it after all.

Adjourned until morning.

Wednesday Morning Session.

At 9:30 o'clock the meeting was called to order with a good attendance, and first listened to the reading of an essay by J. N. Stearns, of Kalamazoo, on

PREPARING FRUIT FOR MARKET.

This may seem an old and simple subject to many, and we do not expect to say anything new, but if by a few illustrations and comparisons we can help to bring about, as we consider it, a great desirable end, we shall feel satisfied.

We have for years looked at the State of Michigan as *the* fruit State of the Union; that is, we can grow a greater variety of fruits successfully than any other one State. Eastern and Southern nurserymen admit this by flooding the State with agents to sell their goods, and a large amount is being planted. This being a fact, it is the duty of this Society to look to all points of interest pertaining to the successful marketing of the same.

It was said twenty-five years ago that apples would not be worth picking in ten years from that time, and I know of a farmer in western N. Y. that cut down an orchard of ten acres with that idea, but has since planted an orchard of twenty-five acres and is realizing very handsome profits from the same.

That time has not come, and I think never will, when good fruit, *properly* put on the market, will not bring a remunerative price. The State is comparatively new, and up to the present time but little more than enough has been grown to supply home consumption, and the demand was such that it brought a fair price, no matter in what condition it came to market. But that time has passed, and we are planting fruits to-day that must look to other States and countries for market, therefore it becomes us we see to it that our fruits are properly assorted and prepared, to give our State the reputation desired. If every individual offering any fruit for market for the next five years, would put it in the best possible condition, what would be the result? we might make our own prices and find a ready market. I one season picked one hundred qts. of strawberries that I readily sold for \$25.00, at the same time plenty of inferior fruit was being offered for eight or ten cents per quart. Many will say they cannot afford to sort out the small fruit. I have frequently taken five quarts of strawberries, just as picked from the vines, and assorted them, and got four and one-half quarts of perfect and fine berries, and one and one-half quarts small ones. This rule will apply to apples, peaches, and all fruits where there is a difference in size, the small ones falling in between the large, not helping to fill up but little, and mar the appearance much. We have sold peaches readily, by properly assorting, for three and four dollars per bushel, which would not have brought more than two dollars just as picked from the tree. I have often been interested in watching the effect upon the public of the different modes of putting fruit upon the market. They will pass bushels of fruit *thrown* together with scarcely a glance, while a single basket of fine fruit put up in a neat and proper shape will cause nearly every one to stop and admire, and even the miser to involuntarily clutch his pocket-book as if in fear some of its contents would go out in purchase of that basket.

The following was my mode of picking and assorting strawberries: I required the pickers to carry two baskets, or boxes, at the same time, one for large and first-class berries, one for small and inferior fruit. They readily adopt this plan when you illustrate to them that they are gainers by it in the

number of quarts they can pick. This saved the rehandling and sorting, which is quite important with strawberries. I never allowed pickers to take hold of the berries and pull them, but to take hold of the stem close to the berry and pinch or cut them off with the nail. Picked in this way the berry is not marred, and with the short stem will keep much longer in good condition.

I was raised in western New York, a section thought at that time to be the best apple section in the country. I was surprised on coming West to see the way apples were brought to market; thrown into a wagon in bulk, having the appearance of being shook from the tree, at that. My confidence in their keeping qualities was so much shaken, I imported five barrels from the east at an expense of five dollars per barrel, but the following July I presume I had the only apples in Kalamazoo. Apples in western New York are all carefully picked, assorted, and packed in barrels in the orchard. The first tier on the bottom must all be put stem down, and the barrel filled so full that it requires a hard pressure to get the head in. This makes them so tight that if carried any distance they will not become loose. If the buyer finds a barrel packed so as to rattle, it is rolled out one side. Each barrel is marked with the producer's name.

I have picked ten barrels of apples from one tree and sold the same for three dollars per barrel, making \$30. How long would we have to crop the same ground with any kind of field crops to realize the same money? I have been in Michigan thirteen years, and I am convinced we can grow just as good apples here, and that will keep as well when our trees have attained the same age, and we handle with the same care.

It may not be generally understood that the same kind of apples grown on young trees will not keep as well as those grown on older ones. The fruit of young trees is usually handsome and larger, and matures earlier, and is not as firm or fine grained, and therefore, will not keep as well.

It is frequently asked what is the object and good of this Society? Let us be able to answer in the near future, that through it, a world-wide reputation for our fruits has been established that shall be the envy of every State in the Union.

Byron Markham, Saugatuck.—I am satisfied that there would be money in throwing away the small fruit rather than sell it mixed with the best of the crop, and I thoroughly appreciate the force of Mr. Stearns' remark, that by separating out the small specimens from each box or basket we do not lessen to any great degree the volume of the best quality, and the seconds are clear gain when marketed by themselves. But there is one point in connection with marketing that presents a discouraging state of affairs. A man puts up this fruit in the best shape possible, and is proud to have his name accompany the package. It reaches Chicago or some other great mart and the package is overhauled, small specimens put in the bottom, put together again, minus some of the best samples, and still the name of the grower accompanies the package. If this thing cannot be stopped a man cannot even by the most strict integrity control his own reputation.

Mr. Emery, Chicago.—In the newer tricks of marketing, I note the employment of colored tarlatan, which gives the fruit, whatever it may be, a rich roseate hue, and is in itself an illustration of the oft repeated quotation, "There are still unexplored regions of conscience." A man who wishes his fruit to be appreciated for what it is worth, will do well to put up such a quality as will need no assistance of colored covering to give it a respectable appearance.

We need an accurate measure for fruit that shall be a standard in the markets. I am satisfied that the question before us is of the greatest importance to those who make fruit growing a business out of which to get money.

Mr. Hanford.—A good rule for us all to follow is to never put into baskets what we would not purchase ourselves. I am satisfied it pays to separate fruit into three grades, and then the first grade will sell for more than the whole unsorted. I saw pears from California put up in peculiar boxes, which sold for large prices. I took accurate measurements of the boxes, had some made, and shipped my best pears in these packages. The result was I received nearly as much as the California pears sold for, and without any deceit whatever, for without doubt my fruit was the most luscious.

In peaches I know one had better throw away his seconds than to have them mixed with the best.

Thomas Wild, Berlin.—I have had some peculiar experience in the shipping of apples. I was connected with the purchase of quantities of apples one fall, and the apples were to be packed according to special instructions that no poor fruit should go into the barrels, and that as a guaranty of the contents of the barrels each one should bear the packer's name. I went off with the shipment of fruit feeling that with a lot put up on honor I could command the highest price. I found commission men did not buy on hearsay. Several of the barrels under my charge were opened and inferior apples were found distributed through them, and it was with the greatest difficulty that I marketed the lot at any price. The farmers who put these apples up were not so much in blame for they were ignorant of what constitutes marketable fruit. They did not know that an apple with a jam on one side was ranked as a second or third, neither did they understand that a worm hole through the apple in any direction but from end to end makes a second of it. Here is where selfishness ought to crop out in making as saleable a barrel of apples as possible, rather than in getting as many seconds along with the best as they will possibly carry. We are behind our friends who live on the lake shore in this matter of marketing, but if we cannot learn by telling, we shall have to await a time when our own experience shall have taught us the fallacy of making money by being stingy in selling fruit.

E. J. Shirts, Shelby.—This matter of ignorance extends to the mixing of varieties. For a good many years I made the marketing of apples a specialty, and it was almost impossible to make people understand the necessity of packing each kind by itself and marking the variety upon the barrel.

H. B. Chapman, Reading.—It is not ignorance, but dishonesty. Farmers are not exempt from this frailty. Apples of second quality are willfully placed in the barrels in a majority of cases, and with the expectation of making something by it, and barrels of mixed apples are marketed as Greenings or Baldwins when the packer knows he is deceiving. I am glad to have such fellows brought to their senses.

Mr. Wild.—I am told by commission men that it is desirable to have two tiers of apples laid carefully in place at the upper end of the barrel, as it gives a thoroughly good appearance when the head is opened.

Mr. Pearsall, Grand Rapids.—One tier of placed apples is enough for me, providing the barrel is what it should be throughout. I am satisfied it pays to have uniformity, have the tier at the head a true index of the whole barrel. I have marketed a good many apples, and by this method found my apples were sought after.

Mr. Hanford.—The Quakers down in Pennsylvania have a very neat way of handling their apples. They have square boxes, holding a bushel, in which the apples are placed from the tree; these boxes are taken to the cellar and packed away until sale is made, when they are either marketed in the boxes, or repacked in barrels.

Mr. E. Buell, Kalamazoo.—What I say is the result of personal experience. It pays to sell nothing in the apple line but first class fruit. The greatest of care should be taken in packing. The correct name should be on the fruit, and the owner's name attached. It is by persistently following this practice and leading on the Red Canada variety that I have come to get in many instances double price for my fruit. I have repeatedly sold my Red Canada apple for \$7.00 per barrel when good fruit was going at \$3.50, all because my fruit was known to be nothing but the very best of the very best kind. Here is a chance for missionary work, for the mass of our apples are marketed under the false impression that it pays to "tuck in" the poor ones. The worst enemies to our markets are those who buy apples that are jolted over rough roads in a wagon box and pack them in barrels for foreign markets to compete with honest packages. Of course there are none of these men in this convention, but it is for us to educate popular opinion in the direction that will tend to root these men out.

Prof. A. J. Cook, chairman of the standing committee on Entomology, as his report for the year, gave a paper on

THE GRAPE PHYLLOXERA.

In a lecture which I gave before the Michigan Pomological Society in 1875, and published in their report for that year, after giving the history, natural history, etc., of this terrible destroyer, I drew some comforting conclusions in view of the past success of grape growing in our country, though in the very face of this incomparable pest; but added: Yet it behooves us all to look into this matter of the Phylloxera, for very likely much of our ill success with certain varieties has been owing to a cause of which we had no knowledge or even suspicion.

There is reason to believe, in view of more recent experience, that the above suggestion merited more attention than it received. We seldom buy ammunition with which to fight possible enemies, and I doubt not that we are happier, in that few of us believe in scenting evil that is afar off. Yet I am constrained, in view of what I deem not only prospective but present dangers, to again sound a note of warning.

It is well known that the subject of black-rot in grapes—for years the cause of some anxiety—has of late become a matter of the most serious consideration in some parts of this and contiguous States. Especially since 1864 has this evil been rapidly increasing, not only reaching out to blight new vineyards, but also clutching in its withering grasp many new varieties. Indeed, many fruit-growers in Ohio have given up viticulture because of this serious pest. Now it is a question of no small moment, whether there is any relation between this fatal rot and the Phylloxera, known in some places at least to be the arch destroyer of the vine. As I shall show in the sequel, there is some reason to believe that these hold the relation of cause and effect,—that the Phylloxera vastatrix in short, by its withering presence, so destroys the vigor of the vines

that they fail to ripen the fruit, and as a result we find black-rot among the grapes.

THE PHYLLOXERA VASTATRIX, PLAN.

So full was the description given of the grape louse in the lecture already referred to that I beg leave to refer you to that, and only briefly recapitulate here.

The Phylloxera is an American insect of quite recent importation into Europe. That it has been sucking the vitality from our vines during all the past is beyond question. The insect is polymorphic, or exists in several forms, each peculiar form either the result of peculiar conditions, or else the laws governing its development. In every form the lice are exceedingly small,—appearing to the unaided vision as mere specks,—whose vitality would hardly be believed, except as they are seen to move. One form is smooth, oblong, and yellow, and only works,—at least this is probable,—in galls on the leaves. These galls can not fail to attract attention, as they sorely mar the appearance of the foliage. They are caused by the irritating presence of the lice. Within the galls the young galls are brought forth and partially developed. These gall-inhabiting and producing Phylloxera are agamic, that is they reproduce without males,—are apterous, or possess no wings, and seem to do the vines little harm.

Another form—the root form—is not smooth, but covered with wart-like projections, is oval, of a greenish yellow hue. These, too, like the others, are agamic, and apterous. These, on the other hand, are by no means harmless. They, by puncturing and sucking the juice from the roots, cause them to appear knotted, to die, the plant to decline, and when the lice are numerous, to wither away. I have good reason to believe too, that in some cases at least, if not in all, they are the cause, perhaps indirect, of the black-rot.

In summer and autumn another form—the progeny of these agamic root-lice—appears with wings. These come forth and by flying to other vineyards to deposit their eggs, spread this terrible evil with a rapidity not otherwise possible.

From the eggs of these winged lice, which eggs are of two sizes, come forth the true males and females. After mating, the female louse, lays a single egg, which may produce the leaf or root-form, as circumstances decide.

Such in brief is the natural history of these insects as determined by European and American naturalists. Hence we see that the presence of these pests in our vineyards, need not be a matter of conjecture only, for though the insects are mere specks, and hardly to be discovered by the unpracticed eye, this is not true of the galls on the leaves, or the knots on the roots, either of which give quick indication of the dreaded foe. The knotted roots may not be readily found on vines long and severely affected, as nearly all the fibrous roots, those which feed both vines and lice, may be dead, but by examining several vines, the quest will most surely be successful, if the foe is present, as the knots are very prominent, and upon the knots one soon learns to detect the minute lice, as there are almost sure to be from one to several around each knot.

DO THE LICE CAUSE THE BLACK-ROT?

While I may not affirm positively that this is the case, I have reason to think that it is.

September 29th I visited the magnificent Delaware vineyard of Mr. Williams,

of South Haven, Michigan. The vines were loaded with beautiful fruit, and hardly a cluster was at all defaced by the rot. On a thorough examination I found no appearance whatever of the Phylloxera. The same day I visited the vineyard of Mr. Haigh of the same place. A little rot was seen,—not very much,—and some Phylloxera,—not very many. Wherever we found what vine-growers call black-rot, we found more or less Phylloxera on the roots.

But the best opportunity I had to study this disease was at Grosse Isle, in the Detroit river, about twenty miles below the city, at the truly magnificent vineyard of Mr. Edward Lyon, which I was requested to visit, and which I examined September 22d.

This vineyard, for size, beauty of location, excellence of arrangement, judicious selection of varieties, and thoroughness of culture, has, I am sure, no equal in Michigan. In fact, it is not surpassed, if I mistake not, by the famous Island Vineyards of Ohio. It is 18 acres in extent, fronts the main branch of the river, while in the distance may be seen the broad surface of Lake Erie. The soil is a rich *heavy* clay loam. The vineyard is thoroughly drained, the tile drains being 30 feet apart throughout nearly the entire vineyard. The vineyard has not been heavily pruned, and the amount of wood is just tremendous. The setting, too, of the grapes surpassed anything I had ever seen this side the famous grape-growing region of California. Two years ago the net proceeds of this vineyard were \$3,000. That year the season was *very dry*, and the rot affected only the Iona grapes, rendering that variety nearly worthless. Here, then, was rot even in a dry season. Last year the season was very wet, and the amount of wood and the setting of grapes very great, while the rot was general, affecting more or less the entire vineyard. This year, all varieties, including Concord, Clinton, and Delaware, which the noted vineyardist, Mr. Geo. Campbell, of Delaware, Ohio, says he never knew to rot, and the Rogers' No. 4 (Wilder), 9 (Lindley), and 22 (Salem), are badly attacked with the rot, so that the profits of the vineyard are really nothing. In fact, I question if the vineyard really pays expenses. The present year has *also* been very wet, so that for days together, it was hardly possible to go into the vineyard, because of the mortar-like condition of the soil. In the meantime the Iona vines have mostly died. Many others look diseased. Especially did I observe some poor sickly looking Clinton vines, showing that they stood adversity but little better than others reputed more tender and susceptible.

I found by examination, that wherever the grapes were badly rotted, there the attack by lice had been most severe. In an extended examination, I gave correctly, with but one mistake, the condition of the roots, as to knots and lice, simply by observing the condition of the fruit as to rot. Where the rot was excessive, there the roots were sorely affected, often nearly dead. Where the rot was partial—only a few grapes rotten on each cluster—there the roots were more exempt from attack. Where there were very few rotten grapes, as with the Salem and Rogers' No. 9, there was an almost entire absence of lice.

Since determining the above facts, I have written to Mr. Addison Kelley of Kelley's Island, who has been familiar with the Phylloxera for some years, and has closely observed it and its pestiferous work in his own vineyard. In his response he says he coincides with me entirely, in the following

CONCLUSIONS.

Undoubtedly the Phylloxera causes the rot, by abstracting the sap, and thus so lessens the vigor of the vines, that they are unable to ripen all their fruit, and hence many of the grapes wither, which withering may be due to

fungi, which ever seek the weak and feeble plants. This sapping of the vines, too, very likely induces excessive fruiting, as in all organic nature the weak and the feeble are even more prolific, as if, expecting their near demise, they make extra effort to leave descendants that their kind may not be exterminated from the earth. Thus the *Phylloxera* not only sows the seeds of destruction, but induces a condition in the very habit of the vine that renders these seeds more sure to germinate.

That the *Phylloxera vastatrix* is, at least in some cases, the primal cause of black-rot, seems evident from the fact that their presence or absence is sure indication of the presence or absence of the disease. Vines—entire vineyards indeed—where there is an entire freedom from the pest, show no signs of rot.

Of course, I would not presume to say that black-rot *never* occurs, except as a sequence of the enervating attack of the *Phylloxera*. As *they* cause it indirectly by depleting the vitality of the vines, so what ever takes from their vigor *may* induce rot. Yet we have good reason, I think, to prefer strong charges against this minute yet powerful destroyer.

In Ohio, such admirable authorities as Messrs. Campbell, High, and Secretary Batcham, while all feel that the *Phylloxera* is at times a serious injury to our American grape vines, still question the statement that they cause the rot. These gentlemen think they have seen rot where there were too few *Phylloxera* to account for it. They say that the black-rot almost invariably succeeds a very humid atmosphere with great heat. So they ascribe the black-rot to atmospheric causes. Still, we have reliable testimony that this malady has attacked Iona vines—a feeble variety, and one most liable to attack from *Phylloxera*—and sometimes others, when such atmospheric conditions were not present. It may be possible, and there is some reason for the belief, that the immediate cause of the rot is fungus attack. If this be true, then surely the *Phylloxera*, by drinking up the vigor of the vines and lessening the vital force in the fruit, are just preparing the soil for the noxious, microscopic plants, and the hot, moist atmosphere is just furnishing the conditions amidst which such vegetable growths luxuriate. But the failure of the rot in many vineyards, and those too of regions where the rot abounds, argues that there is still a predisposing cause.

But some will ask, indeed, many have already asked, Is not the vine first sick from other cause, and does not the attack of the insect follow as a result of this preindisposition of the plant? I answer that there is no good reason for such an opinion. Wherever this *Phylloxera* has committed its terrible havoc, the strong no less than the weak vines have been made to pale and die. Again, there is often such a similarity in habits among all the members of the same family of animals, that we may reason with strong force from one to another. Now, every entomologist, as well as every observing pomologist, knows that it is not the custom of any of the family Aphidæ, or plant lice, to attack the weak plant or tree. The very strongest cherry tree, willow, or even dock, will suffer attack, and soon be fairly alive with the peculiar aphides that essay to suck out their very life juice, and the very first season, will almost perish as a result of the attack. Yet, the very next season, when, if the above theory were correct, we should expect a sure return of the pests, and as sure death to our choice fruit and shade trees, we find our favorites entirely rid of the fell destroyers. I have frequently noticed this with our willows, both native and exotic, and who of you have not noticed it in case of thrifty young fruit trees? It is the most thrifty plants, as well as the sickly ones that suffer from this

ubiquitous pest. It is characteristic of some borers—especially the larvæ of various beetles—and of some two-winged flies, to attack the dead or dying tree or plant. Not so, I think, with any other of our insect pests. We must conclude then, that the Phylloxera comes not as the sequence of disease, but as the terrible cause of one of our worst plant maladies. To be sure, some high in position argue that fungus weakens the vines, and then the lice come because the vines are devitalized. Yet we all know that fungi as a rule attack the feeble, which is not true of lice. I believe the argument has little to support it.

Is the case hopeless? I think not.

1st. There have been Phylloxera in our country for years, and yet grape-growing has been almost a constant success.

2d. In 1875, I found Phylloxera at Monroe, and the island vineyards of Lake Erie. Yet there has been, as I learn, no rot at Monroe, and at the island vineyards the experience has not been such as to discourage the vineyardists. Even this very year I am informed that the vineyards are being enlarged on several of the islands.

3d. None of our insect foes are equally bad every year. The fact that Phylloxera and the attendant evil black-rot, have come with terrible severity this year, does not argue that the same will be true next year, or in fact any year of the future. It would seem that most varieties of our grapes (Iona, Isabella, and perhaps Catawba may be exceptions) will thrive even when attacked by the Phylloxera vastatrix, except that a very wet year, poor drainage, large amount of wood, excessive bearing, each or all, may so reduce the strength of the vines, that they are unable to stand the root-pruning, at the hands or rather beak of the Phylloxera.

4th. By knowing fully the character and habits of the pest, we may hope to do much to mitigate the evil, if we may not exterminate it. For among our insect-enemies as elsewhere, he that has knowledge, will also possess power.

WHAT TO DO.

We should take the presence, or prospective presence, of the Phylloxera as an unwelcome fact, and keep this in view in all our vineyard management. The vine grower should frequently examine the fibrous roots of the different varieties of his vines, and if he sees the knots, a sure evidence that the Phylloxera are with him, then he should be more than ever careful, to sustain the vigor of his vines.

In France, where the Phylloxera has been most studied, it has been found that flooding the ground of the vineyard for four or five weeks during the resting period of the vines, is most efficacious. Then is it not possible—aye probable—that by plowing from our vines in fall, so that the vines shall stand in a furrow during fall and spring, and thus be surrounded by water for a portion of the time, as would be very apt to be the case, especially on stiff, impervious soils, we might destroy the lice? Mr. Kelley has tried this enough to believe it at least a partial cure, and has left furrows in line of his vines throughout much of his vineyard, the present season. This is certainly worthy a thorough trial, especially on such impervious soils as at Grosse Isle, Monroe, and the island vineyards. The furrows might receive coarse manure, to protect the vines from severe cold, as the water would still stand about the crown of the vine and follow the roots to their extremities.

Again, as we prune heavily and forbid excessive if not all fruiting when we of

necessity prune the roots of our trees or vines in transplanting; so if the roots of our vines are being pruned by the Phylloxera, we should prune the vines to a corresponding extent beyond what is usual, and see to it, either by pruning or by actually picking the forming clusters that excessive fruiting is prevented. Mr. Kelley, already referred to, in response to my inquiry as to the effect of heavy pruning, which I recommended three years ago, for all vines attacked by Phylloxera, writes me that it is very advantageous.

Again if fungi are the immediate cause of the rot, we should expect relief from sulphur. Indeed this has been tried with some show of success, and is worthy a thorough trial. The sulphur should be added so soon as the clusters form, and should be sprinkled on after each rain, as if it is washed off it of course would not prevent the fungoid growth which may perhaps cause the rot. This remedy must be thoroughly applied in order to test its efficacy. One application, to be washed off, perhaps, as soon as applied, will prove nothing. The sulphur may be dusted on to the fruit the same way that it is added to the foliage to prevent mildew.

Thorough drainage, the best culture, in fact every effort to render the vines vigorous, can not be too highly recommended or too frequently urged.

As yet we may not be able to destroy the lice themselves, yet by acting on the above suggestions, we may greatly mitigate the evil they inflict, and perhaps render their attacks barren of any considerable harm.

Prof. J. C. Holmes, of Detroit, who was interested in the matter of this paper, sent the following letters relative to the Phylloxera and grape rot, which were read to the meeting:

DETROIT, November 10, 1877.

CHAS. W. GARFIELD, *Secretary*:

DEAR SIR,—Yours of 5th instant was duly received. In answer I will say that my time is so fully occupied I think I will not be able to be with you at the annual meeting of the Pomological Society. It would afford me much pleasure to be present and meet such of my old horticultural friends as may be there.

I cannot promise a paper at present. I will give you a little item about the Phylloxera. You know that the grapes in some of the vineyards at Grosse Isle were, in some way, the last summer, destroyed before coming to maturity. I see by the papers that Prof. Cook thinks the state of the atmosphere, want of drainage, etc., had something to do with the destruction of the grapes. Perhaps it is so, but I think the Phylloxera is a little at fault in this matter. A few weeks since, Doct. Benedict brought me a few grapes from his vineyard on Grosse Isle that had been injured as described by Prof. Cook. On some of the grapes that were still fresh I noticed a semi-circular mark, similar to the mark of the curculio on plums, and within the part bounded by this mark I noticed several very minute spots or excrescences which looked very much like the work of an insect. The Doctor informed me that early in the season he thought he would have at least four tons of grapes, but when he gathered his crop he had less than six hundred pounds; all the rest were dried up. He noticed, as the grapes began to show signs of disease, that this little semi-circular mark was upon the damaged fruit, so small at first that it required very close observation to detect it. The mark gradually increased in size until it could readily be seen. On the specimens brought to me it was about an eighth of an inch in diameter, and appeared to be caused by cracking and shrinking of the skin, but it was quite uniform in shape and size on every grape that I examined. I took a thin slice, with a little of the pulp from this diseased part of the grape, placed it upside down upon a glass slide, then under the microscope. I found that this little piece of the grape was filled with Phylloxera, quite lively and feeding on the juice of the grape. This was about the middle of October, of course too late to follow up the investigation. This shows that the Phylloxera in one form and at some part of the season will attack the fruit as well as the roots and leaves of grapes. This may be the cause of the shriveling up of the grapes; I think it is, but cannot say positively without more extended observation. I ask the attention of grape growers to this subject, for

it is for their interest that the true cause of what is called black-rot, shrivelling of grapes, &c., should be known, and a remedy found.

In the second letter he says:

I have been asked if the objects I found in the grapes were not the larvæ of the grape curculio. Thinking some one at the meeting of the Pomological Society may ask the same question, I wish to say, *No*, they were not the larvæ of the grape curculio. They are very minute objects, but under the microscope, with a power of 50 diameters, I had a good view of the legs, antennæ, and body of the Phylloxera.

Yours truly,

J. C. HOLMES.

REPORT OF THE ORCHARD COMMITTEE.

The viewing committee on orchards, vineyards, etc.,—Division N of the premium list—divided the work of making their report, and each member gave an account of a section. The first division of the report was given by Prof. W. J. Beal, chairman of the committee, as follows:

Members of the State Pomological Society:

Before entering upon our duties it was agreed that each one of the committee should write up certain portions of the report, and that each should furnish both the other members of the committee with his notes. In accordance with our plan, Mr. Gulley has written on the Peach Orchards, Nurseries, the Fruit Gardens, and Plat of Raspberries; Mr. Merriman on Cherry Orchards, Vineyards, and Cranberry Gardens; the chairman on Apple Orchards, Pear Orchards, Plum Orchards, Quince Orchards, Plat of Currants, and the Ornamental Grounds.

APPLE ORCHARD OF GEORGE PARMELEE,

Old Mission, Traverse county. As Mr. Parmelee has had a successful experience, probably second to no man in our State, in the planting and managing of apple orchards, we have reported his orchard and his remarks in reference to it quite fully. An additional reason for this prominence is the fact that he has here been experimenting in a new country, quite remote from other cultivated portions of our State. These trees cover 102 acres, with about 40 trees to the acre,—4,080 trees in all.

The following are some of the leading varieties: 800 Golden Russet, some of which have been set five years and were four years old at that time; the rest of the Russets were set later. Of Maiden's Blush he has about 400, Ben Davis 200, Northern Spy 235, the oldest of which have been set nine years; Willow Twig 100, Red Astrachan 150, Grimes' Golden 60, Pomme Gris 60, St. Lawrence 60, Autumn Strawberry 60, Early Harvest 60, King of Tomkins County 25, Baldwin 100, R. I. Greening 150, Alexander 125, Tolman Sweet 100, Esopus Spitzenburg a few, Red Canada a few; also Swaar, Wine Sap, Rox, Russet, Peach Pound Sweet, Bailey's Sweet, Hog Island Sweet, Ramsdell's Sweet, Sweet None Such, Duchess of Oldenburg 50, Peck's Pleasant a few, Ribston's Pippin, Hawley, Fall Pippin, Blue Pearmain, and a tree or two of many other varieties.

With reference to these varieties for Old Mission, he makes the following remarks:

Golden Russet is the most valuable because it is healthy, of superior quality,

keeps well, does not wilt if kept in close barrels, bears well every year. It makes the best of cider. For baking and sauce it is ahead of Esopus Spitzenburg. The apples sold in spring of this year when apples were very plenty at four and a half to five dollars a barrel in Chicago. They were kept in a bin, and barreled in spring without much loss. There was a little twig blight this year. Three-fourths of the members of their farmers' club place the Golden Russet as the first of apples for that country.

He would prefer the Northern Spy for a market to any other variety if he could get by the first ten years, when they do not bear well. It colors well, ripens evenly, holds its flavor well to the last, and keeps long enough into summer. It ships well by water, but is too tender to ship well by rail.

He despises the Ben. Davis, and would be ashamed to unhead a barrel and recommend it or sell it to an acquaintance, yet it sells at a high price late in spring. It is a good bearer of fair sized fruit of even size and quality, and is nice to handle. Buyers, for their own use, do not often purchase a second time. It is a disgrace to any man or country to raise it where they can raise better fruit.

The Baldwin is not improved by a removal to that northern soil. They are apt to rot at the core and have specks of bitter rot. The trees are quite productive, but are rather tender.

The Rhode Island Greening does very well, though a little tender. The fruit is very handsome, but does not keep like the Spy or Golden Russet.

The Red Canada is not much in favor. A few old trees did well, but many died in the late cold winters,—perhaps on account of late fall growth. He has none top grafted.

The Wagener is very nice and salable; keeps well, holds its flavor, but the trees overbear, and will generally be short lived. He does not like the tree. Would set them twenty feet each way.

Maiden's Blush is perfection for color, keeps till the holidays, is hardy and a good bearer. The beautiful fruit sells well.

The Fameuse does as well as Maiden's Blush. The Shiawassee Beauty and Jonathan have not been tried.

The Red Astrachan, in the autumn of 1876, when apples were a glut in all our markets, sold readily in Chicago at three dollars to three twenty-five cents per barrel. They were very fine. In the Traverse country apples like the Autumn Strawberry are used in December.

The Talman Sweet is good in all respects in that section. Roxbury Russet is a little tender.

Alexander is much improved in its northern home, and takes altogether a higher rank than at the south.

TREATMENT OF THE TREES.

While young they are cultivated with hoed crops. After the trees become well established, a variety of crops are raised, as wheat, oats, buckwheat, grass, the latter of which is occasionally plowed in. He has mulched the trees some with straw when in sowed crops. The upper twigs of the oldest trees are now growing a foot to a foot and a half a year. They stop cultivating after or before the first of August, regardless of any bad appearance of weeds. He has often noticed the bad effect of late clean cultivation, as it stimulates a late growth which does not always ripen well in their short seasons.

Mr. Parmelee prunes once a year, not heavily, and then in winter, except he

takes out a few twigs at any season. He prefers to prune in December whether the limbs are frozen or not. He does not bend the twigs. He never removes large limbs, and under no consideration would he ever cut off the main or center shoot. He wants to encourage a head three to four feet high with main leader, and does not open the head but little.

INSECTS.

Of these, Mr. Parmelee says, we have all they have anywhere, and would not have a sound apple if we did not fight insects. We pick off and pick up those which are wormy; we band the trunks with dark brown paper of two thicknesses, to make a dark hiding place for the worms. The bands are four inches wide and are held on by strings, drawn up tight about the center, which is likely to leave the edges a little loose.

He places great stress on picking off the apples to kill the first crop of moths. The fruit he buries, scalds, or throws into a barrel of water. Cut worms are a great nuisance, and are kept from climbing a small tree by a funnel shaped paper tied about the trunk with the open end of the funnel downwards. He sometimes uses pieces of tin three inches wide, set about the trunk and pressed slightly into the ground. These tins are three inches wide, and are bent short at the ends so as to lock together, as one bent band may hold to another bent band.

PROTECTION.

Trees are most apt to die in hollows where the drainage is not good, and where the coldest air settles. He never saw a screen thin enough to the southwest, or in any other direction. He had some trees screened and they killed the worst of any. "The more exposed the trees, the better for the Traverse country," is the united opinion of the members of the Peninsular Farmer's club. To be sure the wind sometimes blows off the fruit and tips over the trees, but the air in motion is better than air at rest in cold weather.

Mr. Parmelee had lost one large peach orchard by over-culture and late growth, but would not hesitate to plant another were it not for increasing his labors.

It was with some hesitation that the committee passed this grand orchard without a diploma. With a few more years and continued good care this orchard promises to be one of the most famous in the State, or even in the United States.

APPLE ORCHARD OF SAMUEL B. SMITH, GRAND RAPIDS.

This orchard contains about 1,400 trees, of different ages, from twenty-four years to twelve years old. The prominent varieties are Golden Russet, Baldwin, Red Canada, Esopus Spitzenburgh, and Rhode Island Greening.

About 1,000 of these trees were Ben. Davis, set for the purpose of top grafting with Red Canada. They pleased the orchard committee of five years ago so well that they gave a diploma to the owner. Two hundred and fifty have been top-grafted. The crops have usually been good, especially on last year.

It needs but a brief glance at the orchard to convince an expert that the owner does not "live in it," as we may say was the case with many orchards seen by the committee this summer. In case of some of the trees in the old orchard, the owner had apparently become sick of low tops, and had trimmed off many of the lower limbs, some of which were quite large. This practice is

too prevalent in some orchards of our State. The wormy apples were not picked up, the trees have not been scraped or soaped, and no bands about the trees nor hogs in the orchard were employed to kill the codling moths. The leaves of many of the trees had a yellowish cast, denoting hunger or disease. The soil was a strong clay loam, naturally excellent for apples.

THE APPLE ORCHARD OF C. A. SESSIONS,

Blackberry Ridge, Oceana county, consisted of 100 trees in a wheat field. The trees were set seven or eight years ago. A few were dead or dying. The sorts were mixed and some of them unknown. There were some fine, thrifty trees, and some fine looking fruit. The soil appeared rather light for a long lived and profitable orchard. Care had not been taken to prevent the formation of bad crotches while starting the heads of the young trees.

THE APPLE ORCHARD OF H. E. RUSSELL,

Hart, Oceana county, contains 611 trees, of which 100 are nineteen years old, 170 are fourteen years old, and 342 were set three years ago, and a few of other ages. He has tried quite a long list of the most common varieties, and in setting his last trees, selected one-third Northern Spy, one-third Ben. Davis, and the other third Peck's Pleasant. Under most of his older trees was a heavy mulch of straw extending each way about the trees as far as the spread of the limbs. The trees were even and healthy, and in good condition, indicating proper care. The soil was strong with clay subsoil.

THE APPLE ORCHARD OF W. F. LAKE,

Shelby, Oceana county, contains 300 trees set from 13 to 15 years ago. These are Northern Spy, R. I. Greening, Baldwin, Early Harvest, Red Astrachan, Sweet Bough, Golden Sweet, Fall Pippin, Duchess of Oldenburg. The Sweet Boughs were bearing well. None of these trees were injured by the late cold winters. The ground slopes considerably to the northeast. There has been no cultivation in seven years. The leaves of many look yellow, the growth is slow, the bark mossy, and the whole orchard, as a rule, is suffering for want of cultivation, or mulch, or manure. The trees were said to have borne well for some years. From his experience and all he can learn of the success of apples in his neighborhood, he will set next spring an orchard of equal quantities of R. I. Greenings, Baldwins, and Red Canadas.

THE APPLE ORCHARD OF L. H. BAILEY,

South Haven, has been pretty well described in previous reports. The older part of the orchard was set about twenty years ago. About half of the trees were root grafts and the other half natural fruit, which have since been top-grafted. In the beginning he was strongly impressed in favor of top-grafting trees of natural fruit, but he now confesses that he sees no difference in the bearing, growth, or hardiness of the trees propagated in these two different modes. The trees are set forty feet apart in squares, which is seven to ten feet more than is commonly practiced in Michigan. They now evidently need all the room they have. The trees bear full every other year generally, though some bear moderately every year, and a few heavily every year.

This year he has about a fifth of a crop, mostly on trees which bore few or

none last year. For some years he has manured the ground all over heavily once in three years. He mulches also part of the time with chopped apple trimmings, brush, and an abundance of straw. He plows about once in three years, and prefers at that time a heavy dressing of horse manure and sawdust, the greater proportion of manure to the sawdust, the better it suits him. For some years he has not been able to fill his orders for apples. One of the chief reasons is that he raises a good deal of fine fruit, and never ships any but first class extra.

He prunes the center of the trees, making them very open to let in the sun. This may do in the mild winters and cool summers of South Haven, but the committee object to such practice in most localities, and believe that even in South Haven a top less thinned in the center would be preferable. The limbs are started five feet from the ground. With their heavy crops this does not seem too high, for even then the limbs bend to the ground.

The codling moth is kept in check by the use of cloths in the crotches of the trees, by hogs and sheep. The latter have never gnawed the bark of his large trees. He is also making some experiments in reference to killing the moths or in keeping them away from the trees. He is not yet sufficiently satisfied in the results to permit a report to be made.

A CONTRAST—GOOD VERSUS BAD MANAGEMENT.

In all our travels we saw nothing more worthy of notice than the contrast about to be mentioned. It is one every orchardist of Michigan would do well to think about.

Adjoining the famous orchard of Mr. Bailey is another, separated only by a line fence. The soil is the same: the trees were of the same varieties and were set at the same time, and all in both orchards treated alike for the first few years. We have stated how Mr. Bailey treats his trees. The owner of the other orchard has used no manure about the trees. He has not cultivated the land. The trees have stood in the grass. They are mossy, with yellow leaves, troubled with borers, and make a slow growth. Last year, when nearly everybody had plenty of fruit and to spare, this orchard bore but few apples and they were hardly worth gathering, while this year it is hardly necessary to say that there was scarcely a decent apple to be seen.

In the neglected orchard we measured an average tree of Northern Spy. The diameter of the top was about fourteen feet, the circumference of the trunk nineteen inches: while in Mr. Bailey's orchard, a Spy of the same age had a top twenty-two feet in diameter and a trunk twenty-seven inches in circumference. Both the trees had been set seventeen years. We were unable to learn how many apples this well-cared-for tree produced, but last year it hung loaded with fine fruit.

Another Spy near these trees was three years old when set out, and had been standing 20 years. Its circumference of trunk was thirty-eight inches, the diameter of the top thirty-five feet. Two years ago it bore 28 bushels of number one apples, and this year contains all the tree is able to hold. Close to it was a tree of Rhode Island Greening of the same age, which bore two years ago 30 bushels of choice fruit. The circumference of the latter trunk was forty-five inches and the diameter of the top forty feet. One limb spread out twenty-two feet, thus occupying, after 20 years, all the ground and still demanding more in some directions.

Mr. Bailey has no secrets in regard to the management of his trees. If we

were to tell how it happens that he has such "good luck" with his orchard we should attribute it chiefly to two or three causes. The soil is not very dark nor loamy, and is gravel, thus giving perfect natural drainage. The roots of the trees have never been damaged by water. Not being very loamy, the land bears a liberal dressing of manure and cultivation without running too much to wood. The best twigs grow six inches or a foot in a year. With more loam in the soil, he would have a greater growth of timber and less fruit. He might have larger apples, but they would not keep so well nor be of so good quality. In Michigan there are many orchards which would stand abuse,—would stand poor culture, or no culture and no manure, much better than that of Mr. Bailey.

THE APPLE ORCHARD OF WM. H. MILLER,

Berrien Springs, contained 543 trees which had been set two years. They were set twenty-eight by twenty-eight feet, too close for large trees on good soil. The soil here was a sandy loam, with reddish clay subsoil, after passing down eight or ten inches. The leading sorts are 102 Wagener, 127 Baldwin, 64 Ben Davis, 40 Rhode Island Greening, 29 Spies, 28 Mann Apple, 48 Red Canada, top-grafted, with a few of quite a number of other common sorts. He expects to make the most money out of his Ben Davis, considering the number of trees. The odd sorts with only a few trees were set next to the house. The trees are growing well and were in corn this year. They have had very good care, except that he has lost nine from the rabbits. His orchard is 140 feet above the river, which lies half a mile away.

THE APPLE ORCHARD OF JOSEPH H. WETMORE,

Allegan, contained trees of several ages. The soil is a dark reddish, heavy loam, a deep and strong soil for farm crops. The surface is quite rolling and rather high. The trees in the orchard entered have been set eight years. There has been on some of the trees on his place a little twig blight for the past ten years. It has not increased any. The 500 trees are for a market orchard, and consist of 125 Baldwins, 150 Greenings, 20 Spies, 20 Yellow Bellefowers, 15 Red Canadas, top-grafted on Colvarts, and several other sorts. They are set 30x32 feet. On the ground he has raised a variety of farm crops, corn, wheat, grass, etc. The heads are quite open in the center. There are some vacancies, mostly caused by rabbits. There is a little fruit, rather more on the trees of Yellow Belleflower, Greening, and Esopus Spitzenburgh, the latter doing very well in this orchard.

THE APPLE ORCHARD OF DANIEL ILGENFRITZ,

Monroe, contains 1,000 trees which have been set two years, and was three years old when set. As Mr. Ilgenfritz was in company with his brother in the nursery business for some years, and had been a careful observer of the successes and failures of orchards in all parts of that county, and neighboring counties, and as he has now retired from the nursery and gone to planting quite largely to several kinds of fruit, we were quite interested to see how such a man would start an orchard. Here may be learned by most men lessons well worth remembering.

The land was strong, rather level with clay subsoil. It was well tiled, three feet or more in depth, the tiles being 62 feet apart. The stumps were all cleared out. The trees are 36x36 feet, set quincunxially. The trees were all

taken up in the fall and placed in the large cellar where the nursery firm of Mr. Hgenfritz place all the trees which they intend to sell the next spring. They were all of one variety, the Autumn Strawberry. In the spring the trees were taken to the orchard, and heeled in, the 15th of May. They had been well taken up, and not exposed, except for a few moments. The trees were taken, a few at a time and set about as deep as before in freshly made holes. Fine soil was placed about the roots by hand. The roots were not puddled, nor the trees staked. The soil was well packed about the roots. Part of the land had previously been a poor clover sod, and a part had been in corn, and another part in oats. Last year, in August, he placed four buds in each tree. He budded 500 to Red Canada, 300 to Island Greening, 200 to Baldwin. Some of the limbs—last year—the year they were set, grew thirty inches. About ten trees lost the buds, which were set in the tops. The trees are growing finely this year. The orchard was in corn. The cultivation stopped the last of July. This has allowed the weeds to grow, but the best orchardists of Michigan have all learned that there is nothing more desirable in an orchard in autumn than a good crop of weeds or some other vegetation. In autumn he wound the trunks of trees up to the limbs with coarse paper, and outside of this another layer of tarred paper. A mound of earth was placed about each tree. Through accident or design he neglected to protect one tree, which was gnawed from the ground to the limbs by rabbits, and perhaps also by mice. The cost of putting on the papers was about ten dollars for 1,000 trees, or a cent apiece. Except this one tree all were alive and thrifty at the time of our visit. There is no secret about all this. It is simply good management—the thorough work of a thoughtful man who understands the business. At the same time, the same man set 500 pear trees, 500 quinces, and some hundreds of trees of plums and peaches and cherries. Not a pear tree was lost, and but very few of either of the other fruits.

On the west side, next to the orchard is a native forest, and at the south, a few rods distant, is also a forest. He has also planted screens of Norway spruce between the pears and apples, and to the north of the apple trees. The screen he intends to keep at the height of eight feet. The committee doubt very much whether the forests on the west and south will not cause more harm than good to his orchard. The low, thick screens of Norways we think would be better if they grew taller and were scattered, or the rows somewhat broken. In this way the force of the wind would be checked, but not cut off entirely.

THE APPLE ORCHARD OF S. W. DORR.

Manchester, consists of about two acres. The trees were set 25x33 feet in the year 1863,—fourteen years ago. There are 72 Baldwins and 54 Spies. In 1866 those here named Baldwins were top-grafts with Spies. The same year he lost \$300.00 by not leaving the Spies ungrafted. The Spies have borne three crops, the last one, in 1876, was very large. The owner thinks the orchard is on the highest land in Washtenaw county. Wells in that place are a hundred feet or more in depth. Baldwins winter kill some in the neighborhood.

THE APPLE ORCHARD OF CHARLES CAIN.

Reading, Hillsdale county, contains 106 trees, which were set fourteen years ago. They were planted in squares 28x28 feet,—too near for such varieties in such soil. The soil was sandy loam, dark colored pretty well down, even down

two feet in some cases. In starting the heads the owner had formed or allowed the trees to form some bad crotches. These he had in numerous cases tied together with grafts or by twining branches together. The trees have been manured every three years; the land cultivated occasionally. Some ashes have been used. Last year the yield was about 175 barrels of very choice fruit, and six years ago it bore 150 barrels. It is a profitable orchard and very well managed.

THE PEAR ORCHARD OF J. G. RAMSDELL,

Traverse City, has been planted six years, and contained something over 40 trees. A few of the trees have been set only three years. The trees are set 16x16 feet, and planted with currant bushes. A considerable quantity of hard wood ashes have been used. The foliage is dark and glossy. There are about equal proportions of Virgalieu, Duchess, Buffam, Seckel, Bartlett, Flemish Beauty, Louise Bonne de Jersey. He now prefers for his locality Bartlett, Flemish Beauty, and Virgalieu. One tree was injured during the cold winter two years ago. The pear trees have not been pruned since they were set, and the committee thought their shape good. Judge Ramsdell last year placed a knife in the hands of our President, T. T. Lyon, and asked him to prune some of his pear trees in the best manner. He passed over several trees without cutting a limb, and returned the knife, saying that he did not think he could better the trees any by cutting off some of the limbs. The exact words of the reply we did not copy at the time.

THE PEAR ORCHARD OF GEORGE PARMELEE,

Old Mission, contains 1100 trees, which have been set from two to eight years. The varieties selected were 550 Bartlett, 100 Flemish Beauty, 100 Beurré d'Anjou, 100 Sheldon, 100 Belle Lucrative, about 100 or less each of Virgalieu, Doyenne d'Ete, Clapp's Favorite, Vickar, Lawrence, Beurré Easter. The above were selected without having any old trees in the county to serve as a guide. Now, if setting a pear orchard, he would place Flemish Beauty and Bartlett in equal proportions. The fruit of Flemish Beauty keeps better than at the South, while Bartletts are not improved by going North. Flemish Beauty is fine in shape, color, and flavor. The tree is productive and hardy. Mr. Parmelee trims but very little. He allows the center to run up, and the lower limbs to start as far down as they will. With most varieties he would prefer the lower limbs within a foot and a half of the ground. The cultivation and the soil are the same for pears as for his apple orchard mentioned on another page. He always ceases to cultivate as soon as the first of August. He does not believe in cultivation without some crop, as he thinks the hot sun burns out the vegetable mould. He prefers some crop on the ground, even a crop of weeds, to nothing. This view is quite prevalent in the Traverse country and in some other portions. A very few trees had been injured by snow and ice. They have been very free from blight, though occasionally a tree had suffered from this cause. Last year for the first, three died of blight. Last year he picked 250 baskets of a peck each, which sold at a dollar a basket. This is the finest pear orchard we have ever seen in Michigan, and bids fair to keep ahead of any or most others. It has maintained its good character as shown four years ago.

Reynolds & Tracy, of Old Mission, Grand Traverse county, have pear orchards containing about 1200 trees. Many of them set two or more years ago. They

have found some of the varieties so far hardy in the following proportions: Clapp's Favorite, 95 per cent; Flemish Beauty, 80 per cent; Bartlett, 70; Howell, 70; Beurré Clairgean, 70; Winter Nélis, double worked, 20; Beurré Bose, double worked, 33; Beurre Gifford, 35; Madelaine, 5.

THE PEAR ORCHARD OF WM. SOURS,

Blackberry Ridge, Oceana county. This contains 100 trees with raspberries mixed in between the rows. The oldest have been set six years. There is no fruit on the trees, which appear to be in thrifty condition. We see no reason why this county cannot become famous for good pears.

THE PEAR ORCHARD OF C. T. BRYANT,

South Haven, contains 40 trees, all of which were dwarfs. They have been set nine years and have nearly all done well. There are six vacancies in the two rows. The varieties are Seckel, Buffam, Louise Bonne of Jersey, Duchesse d'Angouleme, Flemish Beauty. The owner leaves the grass about the trees, but plows a strip between the rows. He has applied some ashes and lime, apparently with good results. He cuts back heavily very early in spring. The fruit from these trees in 1875 brought \$32; in 1876 it brought \$28, after taking out freight, commission, and packages.

THE PEAR ORCHARD OF JOSEPH LANNIN,

South Haven contains 350 trees set four and five years ago. They are all standards, planted 24x24 feet. There are 125 Bartletts, 80 Beurré d'Anjou, 40 Sheldon, 40 Howell, 20 Clapp's Favorite, 30 Flemish Beauty, and a few of numerous other sorts. A considerable portion of the trees were set in a very bad season—the one preceding the first of our recent severe winters. The soil is a strong clay, apparently good for pears. There is no drainage, except what nature has given on the slopes of the rolling land. In our opinion the trees have been damaged for want of more thorough drainage. The orchard has been in corn every year; the land plowed up to the trees in autumn and away in the spring. No manure has been used. Some of the trees have grown thirty inches in a year. The owner prunes early in spring, cutting off a little over half of the previous year's growth. The trees are beginning to bear some fine fruit. With the exception of drainage, Mr. Lannin has taken great pains with his orchard. In rank, we should place it next to that of Mr. Parmelee's.

THE PEAR ORCHARD OF WM. H. MILLER,

Berrien Springs, has been set two years. It contains 42 trees, set 28x20 feet. The varieties are Bartlett, Flemish Beauty, Seckel, Beurré d'Anjou, Sheldon, Osband's Summer, Tyson. The Flemish Beauty appears to be doing best, though all are looking well and ripening wood as they ought to for winter. There are no vacancies. This is on sandy and clay loam mixed, a soil which is nearly certain to produce large farm crops. The trees would, no doubt, be longer lived if the soil had been well tilled. This is a fine young orchard.

THE PEAR ORCHARD OF C. ENGLE,

Paw Paw, contains 9 Bartletts, 12 Duchesse d'Angouleme, 2 Flemish Beauty, 2 Louise Bonne de Jersey, 2 White Doyenne, 8 Doyenne Boussoeck, 8 Tyson, 10 Beurré d'Anjou, and a few others.

The soil is gravel and clay mixed, varying in some places to almost every-

thing else. Most of these trees have been set 15 years, and have borne more or less since the first four years. They are all dwarfs except the Bartletts and Flemish Beauties. It has been cultivated nearly every year. Beside these trees and near them are large numbers of others going with the blight. The owner at one time thought that some sorts were going to escape this dreadful scourge, but he "gives it up" and soon expects to cut down all the trees.

Perhaps the blight has been hastened by the failure in late years to remove parts of a blighted tree, or the whole when thus affected.

THE PEAR ORCHARD OF D. ILGENFRITZ,

Monroe, contains 500 trees which were two years old when planted. They have been set two years. The trees were not large of their age when selected for the orchard. The owner does not believe in overgrown or very rapidly grown trees for setting. They are all standards, set in quincunx order, each tree 20 feet from those surrounding it. There are 200 Flemish Beauty, 100 Bartlett, 50 Sheldon, 50 Virgalien, 50 Buffum, 40 Beurré d'Anjon, 10 Clapp's Favorite. The tops or heads are started about three and a half feet high. The orchard is in corn with no cultivation since the last of July. At the close of the first year there was not a single vacancy. Four trees died last winter and were replaced in spring. At present there are no vacancies. The soil, planting and general management of the pear orchard has been the same as that of the apple orchard of the same age previously described.

In passing over the State this year, there was seen an unusual number of trees affected with the blight. The outlook for pears in Michigan is quite discouraging, according to all we can learn. It does not seem wise to make a very large outlay in starting a pear orchard. We earnestly hope the day may speedily come when some light may be thrown on the disease so common to pear trees, but until that time probably most of our best pears will come from trees scattered a few in a place, here and there, over the country in favored localities. We trust that all fruit growers will not give up pears without a struggle, but that they will continue to observe and experiment.

THE PLUM ORCHARD OF J. G. RAMSDELL,

Traverse City, contains 700 trees, set 16x12½ feet. Two hundred of these have been planted six years; 200 have been planted four years; and 300 have been planted three years. They are all on plum stock. They have not been trimmed, except, as Mr. Ramsdell says, he has taken off the "fiddlers." The land was stumped, and blue grass sod turned under in some cases for the tree-planting, and in others the trees were set after potatoes.

Some hoed crops have since been raised, and one year buckwheat was sown on late in the season. The sowing of buckwheat he thinks was an injury to the trees. About some of the trees for a part of the time he has sown half a bushel of hard-wood unleached ashes. The ashes have produced an excellent effect in the color of the leaves, the growth of the tree, and very likely added to the quality of the fruit. This spring he harrowed once and let the weeds grow except under the trees, where the ground was kept clean to make it easier to pick up the injured plums as they fell. The weeds, although rather unsightly, he considers an advantage to the ground.

He usually cultivates very late in autumn to aid in killing the climbing cut worms, which are very annoying on his farm. They sometimes, if unmolested, climb a tree and eat out every bud. To keep the worms at bay, he places

pieces of tin about the tree. These have a joint by which the tin may be put around the tree. When they are locked together, the lower edge of the tin is pressed a little into the soil, and the rest, like a bottomless cup, projects two or three inches above the ground. These tins are used about all young trees. The worms cannot climb the tin and they do not know enough to dig under. The trunks look very clean and healthy. There are a few borers which are hunted with a wire and knife: they are cut out or punched to death. To keep away the curculios he picks up and destroys all the fallen fruit. He has tried the Ransom-chip process, but does not think it worth using on his place. He runs a hopper-shaped canvas under the trees—the canvas is attached to a frame which is on a sort of wheelbarrow, having two wheels. He does not pound the trees even with the ball of his hand, as he says it will loosen the bark and injure the tree, neither does he saw off a limb or drive a spike into the tree to pound with a hammer. He places a croched stick against the larger limbs in several different places about the tree, and jars as quickly as he can by his hands, which hold the stick. The jarring is begun as soon as he finds insects, and continued as long as he finds enough to amount to any thing. He has generally only jarred once in three days, but he lives in a new country, and no one near him has any plum trees. He thinks that next year the curculio may be kept down by simply picking up the stung fruit.

We may say here that at South Haven they find it a great advantage to use chips or blocks in taking the curculio. Here we may also add that Mr. Bryant of South Haven has jarred his trees for a number of years with a mallet padded with India rubber. We saw no signs of any injury to any tree from this cause. The insects work the worst on the thin-skinned plums, but would doubtless destroy all alike if there was no chance for a choice. Of varieties he has most of Washington and likes it best; next comes Jefferson. His other sorts are Imperial Gage, Smith's Orleans, Lawrence's Favorite, McLaffin, Bradshaw, Lombard, Pond's Seedling, Fellenburgh, Yellow Egg, Green Gage, Monroe Egg, Bavay's Green Gage. For a hundred trees he would now choose twenty Washington, twenty Jefferson, ten Lawrence's Favorite, seventeen Bradshaw, seventeen Smith's Orleans, sixteen Lombard, thus selecting about equal quantities of yellow and of purple varieties.

From the 200 oldest trees he took three years ago, about 50 bushels of plums; the next year, 75 bushels; this year the estimate was 150 bushels on these 200 trees. The average price at Traverse city has been four dollars a bushel. For shipping to a distant market, he nails in close boxes, 10x10x22½ inches. The plums are closely pressed into the box to prevent motion.

The soil is generally sand and gravel, somewhat uneven on account of the hills and rolling surface. This sand abounds in small particles of lime; even the gravel contains a large per cent of limestone pebbles. Near one of the best trees, we dug down four feet and found a reddish sand soon after leaving the surface. It is generally thought that clay, or rather heavy soil, is best for plums. Perhaps in the Traverse country, with a climate so congenial to the plum, a heavy soil is not so important. Time alone will tell whether trees will thrive and bear to a good old age in this soil. There is certainly now every indication of health and proper growth, such as we should look for in trees expected to last for many years.

On another farm near old mission we saw three sound and healthy plum trees, which we were told had been standing seventeen years. During part of this time, however, they had borne no fruit, as the owners did not understand catching the curculio.

THE PLUM ORCHARD OF L. CHUBB,

Blackberry Ridge, Oceana county, contains 1,000 trees, mostly set one and two years ago. Forty trees are six years old, of which twenty bore an immense crop two years ago. They were propped up, or broken, in some parts. They overbore so this year, and last the crop was light. On that year he shipped twenty-five baskets from twenty trees. For the fruit on each of some trees he received ten dollars. Experience so far has shown Mr. Chubb and his neighbors, in a most forcible manner, the great need of properly thinning the fruit. No wise fruit-grower will ever prop his trees, or allow them to break down with too much fruit. His varieties are quite numerous, but as few have yet borne we need not name the list. Enough has been seen in Oceana county to thoroughly convince the committee that there may be grown plums to perfection.

THE PLUM ORCHARD OF CHARLES W. JAY,

Blackberry Ridge, contains 150 trees of Jefferson, Washington, Lombard, Coc's Golden Drop, Wild Goose, of about equal quantities. This is their sixth year of growth in the orchard. They have not borne much until this year. The trees have made a moderate growth, but they are model trees for soundness of trunk and limb. A few trees had died.

THE PLUM ORCHARD OF WM. SOURS,

Blackberry Ridge, contains 100 trees, all sprouts of Lombard, and set one year ago. Some have been grafted over. All look well. There are a few vacancies.

On the farm of Mr. H. E. Russell of Hart, was a fine sound bearing plum tree, set nineteen years ago.

As before said, we saw enough to convince us that Oceana county has a climate well suited to the growth of fine plums. The fruit as shown at our State fairs for a few years past has attracted much attention. The country is new, and the fruit business, like all departments of farming, is yet in its infancy. We expect to see this county rapidly advance, and shall be disappointed if it does not gain and hold a high rank for the excellence of its fruit.

THE PLUM ORCHARD OF C. T. BRYANT,

South Haven, contains 100 trees, set 12x16 feet, nearly all in bearing. Most of them have been set seven years. The varieties are six Lombard, thirteen Yellow Egg, three Bradshaw, seventy-five Duane's Purple, and three of other sorts. The Yellow Egg rots badly, though the trees do well in all respects. Large plums sell best. His trees are not permitted to overbear. They are well cared for, and Mr. Bryant may be said to live in his orchard. If setting now, he would prefer, 1st, Duane's Purple; 2d, Bradshaw; 3d, Lombard. Last year he shipped to Chicago, and realized \$140.37 for 11½ baskets after deducting freight and commission. The trees occupy but little space. The soil is a clay loam with some sand on top in places. Tiles two and a half feet deep run between alternate rows. The place is on high land, a mile from the lake. All the artificial protection he wants is something to catch the snow. The cultivation is with the harrow and cultivator, beginning early in spring and continuing until the first of August. The trees have been fertilized with some manure and ashes. He catches the curculio with a hopper-shaped canvas on wheels. The trees for five years have been jarred with a mallet padded with old rubber shoes and boots. The mallet is well padded and carefully handled. He jars

early and late whenever he can find any insects. In cool weather insects are caught under chips or blocks, but he relies mainly on the jarring of trees. The trees look well, but not quite so clean and smooth as farther north, though this may be owing to their greater age, to the mode of jarring, and to the fact that the trees when set were culls from the nursery.

THE PLUM ORCHARD OF C. ENGLE,

Paw Paw, contains ninety-five trees, set four years. They are on a gravelly knoll, and like peaches are cultivated early in spring, and often after till August 1st, when the weeds are allowed to grow. The trees are set deep, 18x20 feet, and appear to be on peach stock. There are no borers. The trees are perfect in appearance. The fruit had been too much thinned by curculios, which came on late and stung the plums near the stem. The varieties are Pond's Seedling, Coe's Golden Drop, Bleeker's Gage, Wild Goose, and a few others. At this place we saw the first specimen of the Wild Goose plum which we ever saw on a tree.

THE PLUM ORCHARD OF PORTER BEAL,

Rollin, Lenawee county, contains about 100 trees, mostly on peach roots, and set six or seven years ago. There are a few Green Gage Seedlings, some of which are top-grafted. He has Bleeker's Gage, Pond's Seedling, Lombard, Bradshaw, Coe's Golden Drop, Duane's Purple, Damson. Bradshaw is unprofitable, Golden Drop not very good. The trees after setting were cultivated for several years with some hoed crop, using but little manure. This year there has been little cultivation. Hogs have run among the trees for a year or two. For curculio he jars with mallet. The trees have borne for four successive years. The first crop consisted of fifteen bushels and averaged four dollars a bushel; the second of twenty-five bushels, and sold for four and a half to five dollars per bushel; the third of twenty bushels, at about four dollars a bushel; the fourth is estimated at twenty-five bushels. He cannot begin to supply the demand for plums. A few trees in the orchard had died, and some of the others were injured, still most of those left looked well. The trees are on rather high land, exposed to west wind for nine miles or more. From this orchard we judge that in picked locations plums may be profitably raised in some portions of Lenawee county. The same may be said of many other counties in various portions of the State, while along the shore of Lake Michigan plums thrive, and may be easily raised with proper care in cultivation and in destroying the curculio. The northern portion of this Lake shore seems best adapted to raising fine plums.

THE QUINCE ORCHARD OF CHARLES W. JAY,

Blackberry Ridge, contains about 100 bushes set six years ago. Till this year they had received no care, except to plow by them once a year. None died during the last cold winter. They now appear sound, and look well, although there is but little fruit on them. It still remains to be proved whether quinces can be profitably raised in Oceana county, though we saw nothing which caused us to think otherwise.

THE QUINCE ORCHARD OF DANIEL ILGENFRTZ,

Monroe, contained 500 plants of the orange variety, set two years ago, and were two years old at that time. They are placed in quincunx order, ten feet apart.

Last year there were fifteen vacancies, which were filled. Now there are five vacancies. The plants look well, and are on good, strong soil, tile drained, similar to that described for his young orchards of apples and pears.

In an older quince orchard of Mr. C. Engle, Paw Paw, was seen a good deal of blight. A few miles north of Allegan we saw four quince bushes twenty years old, which have borne full every year for some years. The fruit this year was of excellent quality.

We have often wondered why the markets of Michigan and surrounding States are not better supplied with quinces raised in Michigan. On proper soil, and in suitable localities, which are abundant enough, quinces are a profitable crop.

PLAT OF CURRANTS OF D. M. SHOEMAKER,

South Haven. This consists of one-half acre set three years ago, four by seven feet. Most of these are Victoria, with a few black currants. The Victoria bore some the year they were set out. Last year they bore about 38 bushels, which sold for \$1.50 to \$2 a case of a half bushel. This year there were over 75 bushels, or 152 cases, which brought a dollar a case, after deducting commission, freight, and boxes; *i. e.*, the owner received \$152 for his labor and the use of half an acre of land. He expects his neighbors and everybody now will go to raising currants, and lose money by so doing. There were a few vacancies and plants broken down at the crotches. The land was a strong clay loam, cultivated by horse till August the tenth. There are a very few borers. The plat looked well, and best of all, it paid so well that the committee were unanimous in placing it in a distinct class for a diploma, although there was no such class named by the executive committee of the Pomological Society.

ORNAMENTAL GROUNDS,

Mrs. A. H. Tracy, Old Mission, Grand Traverse county. These grounds contain about half an acre south of the house, next to the road. There is a natural grove in the east of the grounds, which is cleared up for a park. As an east wing to the house is a greenhouse, 12x20 feet. The north part of the greenhouse is used as a potting room. The whole appears in good proportion as a wing to the house. The greenhouse cost but little, is pleasant in winter, and furnishes a fine opportunity to propagate and to winter plants for use on the grounds in summer. The house was screened with mosquito netting, which worked well. Out out of the lawn are numerous beds of graceful shape tastily arranged. These beds have no sharp points which are hard to keep in order, and are worthless for plants. The beds are planted with choice varieties of many species of ornamental plants. In the green-house or in the beds were seen 12 varieties of Coleus, including the Shah, Queen Chameleon; 11 varieties of Caladiums, 8 of Passion Flowers, 60 of geraniums, including Distinction, Happy Thought, Crown Prince, George Sand, and many other new choice varieties; 12 varieties of best new begonias, 4 of selaginellas, 15 of fuchsias, 6 of Thunbergias. There were specimens of the fan-palm, double-flowering jasmine, ferns, variegated tobacco, pomegranate, agapanthus, agaves. We saw 70 varieties of verbenas, 30 or 40 of gladioli, 30 of best roses, such as Queen of France, Marshal Niel, Bourbon Queen. Then we saw tritomas, pampas grass, asters, cannas, among them a seedling better than President Favre; we also saw dahlias, and a nice show of seedling verbenas. In the garden we may mention 2,500 choice pansies, from which they were saving seeds, and a plat

of tobacco in flower, two leaves of which we found to measure 24x17 inches and 23x18 inches.

The lawn was quite affected by severe dry weather then prevailing. Such grounds, so far north in our State, we were not prepared to see. A better lawn and a good supply of water would have been a great improvement.

ORNAMENTAL GROUNDS

of Mrs. Fred. Bush, of Kalamazoo, contain about one and a fourth acres on the corner of South and Church streets. The house is brown, with the main part nearly square, and having a flat roof. Along each street was a row of sugar maples, and on the lot a burr oak, honey locust, two horse chestnuts, some old trees of apple and cherry, a white pine, Austrian pine, some arbovitæ, a mountain ash in fruit. These trees were scattered about the place in a way not to crowd or to shade the lawn too much. There were but few shrubs. We noticed a mock orange and a sweet-scented shrub. There were just about trees enough,—a condition of things rather uncommon in small places.

The house fronts the north. Near the building are quite a variety of native ferns and some other native and exotic plants which love the shade. Some of our native ferns are very beautiful, and we were much gratified to see them freely used. On one side and back of the house, near the barn, was a small, well kept vegetable garden, some small fruits, and a few grape-vines. Next to and in front of these in suitable places, were beds cut in the lawn and filled with the following plants: Gladioli, geraniums, balsams, violets, including some of our natives, a few cannas, some portulacæas, pansies, scarlet sage, begonias, four o'clocks, sweet alyssum, marigolds, petunias, verbenas, phlox drummondii, funkia, pinks, cinerarias, tritomas, fuchsias, lilies, amaryllis, sedums, and deutzias. The petunias lacked sunlight and heat; the verbenas would flower better in poorer soil. There were some vases and hanging baskets. We should have noticed the roses, which were very good, and the use of *Chenopodium botrys* (Jerusalem oak), for ornament and for cutting.

The lawn is well kept, and of course the chief attraction of the place. All trees and flowers are subordinate to a well kept lawn. Water is abundant, and an essential aid to every well kept place. She has not followed one fashion which is quite prevalent in Kalamazoo. She does not shear the evergreens all over in a formal manner so they look like tall green hay-stacks. We commend her treatment of trees as a worthy example for some others to follow. The most striking feature in the place is the free use of vines of various kinds. About the trunk of every tree along the streets, is a Virginia creeper. This or other vines are seen climbing all the trees on the grounds, and up the columns of the porch. She has also introduced two other charming native climbers which we wish to notice especially. These are *Clematis Virginiana* (Virgin's bower), and *Dioscorea villosa* (wild yam). The latter especially is one of the finest wild perennial herbs. Some variety can be secured with both of these in choosing the staminate and the pistillate forms. We saw morning glories, Madeira vine, trumpet creeper, honey suckles, gourds, cypress vine, English ivy, wandering jew, and periwinkle. There were various artificial supports to vines. Over the carriage entrance was an arch covered with vines. Each vine was beautiful, and well cared for, but it seemed to be carried to excess. If half or two-thirds of them were removed the grounds would appear in better taste.

Another point we wish especially to impress on the minds of our readers. Here she has made a beautiful place mostly with common materials. She has

no greenhouse, only an east window in the sitting room in which to start or keep plants. The majority of her most attractive plants are natives of the surrounding ravines and forests. Here may be learned a lesson. Prepare and keep a good lawn, plant and keep a medium number of native trees in variety, in shady places and in sunny spots introduce suitable native and common plants; take good care of them, and you may have home grounds far exceeding anything yet ever seen in Michigan.

We visited places to examine 68 entries, made in thirteen different counties in remote parts of our State, including Traverse, Kent, Oceana, Ottawa, Allegan, Van Buren, Berrien, Kalamazoo, Ionia, Monroe, Lenawee, Hillsdale, Washtenaw. We were occupied 25 or 26 days in the orchards and vineyards, and travelled 1450 miles. We cannot enumerate all the courtesies shown by numerous persons, but we must mention a few who, by circumstance or otherwise, rendered us unusual service. Among these are J. G. Ramsdell, Reynolds & Tracy, Geo. Parmelee, C. J. Shirts, H. E. Bidwell, Wm. H. Miller, C. Engle, and the officers of the following railways: Grand Rapids & Indiana, Chicago & Michigan Lake Shore, Lake Shore & Michigan Southern, Michigan Central, Detroit, Lansing & Northern, Detroit & Milwaukee.

Passing, as two of the committee have for several times in former years in many counties of Michigan, we cannot help noticing the rapid development of fruit culture, and the great extent of land well adapted to raising many choice varieties. We cannot refrain from mentioning the fertile and well improved farms in the older portions of the State, and every year produces wonderful changes in the newer portions. We feel proud of our State, not more for what she has done than for what she is likely to become in the near future.

The Society took a recess for dinner.

Afternoon Session.

After a bountiful lunch provided by the friends of the Grand River Valley Horticultural Society, at 1:30 P. M. the society listened to a continuance of the report of the orchard committee.

C. N. MERRIMAN'S REPORT ON VINEYARDS AND CHERRY ORCHARDS.

Your committee on the vineyards, entered for premium in 1877, will first offer to your consideration and for the study and instruction of those interested in grape culture, the vineyard of Judge J. G. Ramsdell, near Traverse City,—the first or earliest in the order of examinations made, and being the farthest northward of the vineyard entries of this year. The location is high, with eastward slope, overlooking the city and Grand Traverse Bay. This vineyard contains two and one-half acres, with a soil of sandy loam and some gravel, with plenty of lime, and a firm, compact subsoil impregnated with iron: the natural drainage is ample and may well save the extra cost of tiling. The selection consists mainly of the five varieties, in the order of their relative value for profit, in his estimation, as follows, viz.: Iona, Wilder (Rogers' 4), Delaware, Concord, Agawam (Rogers' 15), but few of the latter,—Iona being first in the scale of profit, and netting 15 cents a pound for wine alone, proving too valuable in wine-making to offer in the market with the others; therefore none are sold, and no others than Ionas are used for this purpose from this vineyard. But, for a market grape, the Wilder outranks all his others, it being with him

so good a keeper. He says, "With the Wilder, the market can't hurry me; it keeps as long as you choose; in fact, till it will bring double price," thus yielding 100 per cent over early market prices, though the Delaware sells better during the short season it lasts in prime. Delaware ranks second, and Concord third for market, though fourth for profit,—the Iona being first, and none in the whole list outyielding Iona with him. He finds the Delaware, close pruned, an earlier grape than even the Hartford; also, that for the latter, one-half the care requisite for other grapes suffices. He has tested there many other varieties than the above, and has discarded as worthless in his location, or his estimation, the Croton, Creveling, Eumelan, Israella, Ives, Melinda, Oporto, and Walter; but would have for early a few Adirondack and Hartford.

One hundred and fifty-eight Delawares, set 8 by 8 feet, trained to vertical slats of lath nailed ten inches apart, yielded at two and one-half years from setting,—with not a vine missing,—each ten pounds of choice grapes, sold at ten cents a pound, paying back the full cost of the vineyard, labor, trellis, and all, with ten per cent interest on the whole. Considers the Agawan as good in quality as the Wilder, but not so prolific, and although he claims the Iona, Delaware, Rogers' 4 and 15 to be even better adapted to his place than Concord, yet the latter seemed about as heavily loaded, and looked equally well every way. For all kinds he trains four feet high to trellis of two rails, to vertical slats of lath, preferring one foot apart, and running one and one-half inches below bottom bar to hold the canes hooked under when drawn down for winter; would not lay them on the ground to water-soak under the dense melting snows of their region.

His Delawares had 20 loads of raw muck as top-dressing before planting, and no farther fertilizer for five years: afterwards used one-half bushel of ashes per vine broadcast. He cultivates from May to August 1st, but no later, except once after fall pruning; using sulphur liberally, both as preventive and cure of nearly all ills of leaf, plant, fruit or root,—rot, mildew or oidium, and phylloxera,—believing that if the foliage be kept free, clean, bright, and healthy, all those noisome spectres will and must keep aloof, finding no possible lodgment under so perfect a regimen. He doesn't wait for a visitation from any one of them, but forestalls the whole lot of them by resorting to the sulphur blower, using simply a hand-bellows with a spout and funnel, and going over again later any spots seeming to require it. This takes but 100 pounds for the $2\frac{1}{2}$ acres, costing only seven cents a pound; and a man goes over an acre a day, up and down both sides of a row, about July 1st.

Judge Ramsdell recommends for their region that all varieties be summer pruned heavily, but never closer than within three leaves of the last bunch. This vineyard at three years old had cost exactly 85 cents for each vine, and had paid back just \$1 each, thus paying full cost and interest on the land occupied. Now as many may desire to know how the Judge makes a big crop of Ionas net 15 cents a pound, we here subjoin his method: From 10 pounds of grapes he gets a gallon of wine, by adding to 3 gallons of juice 1 gallon of water. This *must* be added on account of the tartaric acid. The grape sugar thus reduced by water must be replaced by the 1 pound sugar per gallon: the wine selling at from \$1 a bottle to \$1.50 a gallon.

N. E. Smith, of Ionia, entered two vineyards of Concords, and one of Delawares, the first one being 800 Concord vines set nine years, and trained to posts or stakes originally 8x8 feet, but now in one-half the vineyard every alternate row has been removed, leaving them 8x16. He greatly prefers the latter, upon

his very strong soil, as he gets more and better fruit with the shade less dense, gaining more light and heat. These advantages were not so apparent, however, in the younger vineyards.

He used to prune and train by the Fuller-arm system, but now uses two short arms and otherwise the usual renewal system, with long canes of new wood annually. The location is on a ridge with a southern slope, 200 feet high, just outside the city of Ionia and overlooking it. The soil is a strong loam, and at one foot depth a stiff clay; it is not tiled, but would be somewhat improved by tiling. It is slightly screened by deciduous groves at the south. But Mr. Smith is not an advocate of forest protection, but regards altitude and a free sweep of air as far more important, all the protection required for fruit. This was unanimously voted a very fine vineyard. His market is Ionia and Greenville.

Mr. Smith's second entry was 700 Concord, set five years and trained to stakes 8x9 feet. Part of these are on a more sandy soil, and had killed out some in spots and been reset repeatedly; in all other respects the location and condition was similar to the above, with the like training of long canes coiled round the stakes six feet high. He finds this method preferable with these strong growers in his rank soil. The Concord is his best grape for profit. He would pinch back some in summer, plow deep in spring, cutting off roots freely, bleeding them mercilessly, cultivating no later than July, and then sow to turnips.

His third entry was 700 Delawares, set five years, 8x8 feet, which bore \$90 worth the third year from setting, thus early paying back their cost, and now having their third crop at four and a half years old, though last year they mildewed and did not ripen well. The soil, clay loam, needing tile. His extra fine, large clusters of Kalamazoo grape were a surprise, and his Concord, ripened most thoroughly, and were hard to beat.

Columbus Engle, of Paw Paw, Van Buren county, entered a vineyard of over 1,500 vines of the following selection: 900 Concord, 300 Delaware, 200 Ives, 12 Martha, doing as well as Concord, and 100 Iona, doing nothing. This very fine vineyard is eight years old, planted 6x6 feet; is pruned back yearly to two young canes nearly 8 feet long, which are tied in the middle to the top of the stakes 4 feet high, the ends then bowed over to near the ground, and tied there to the stake. His Concord, were extra fine both in size and quality,—bunches very large and berries also,—rarely excelled either in the flavor or weight of crop per acre. He thins out the young clusters some, removing the smaller ones; follows with summer pruning, and pulling off all but two shoots for the following year, garnering all resources into these two long strong canes relied on for the next ensuing crop. His system certainly is attendant with excellent results, and more especially so with his Concord and Marthas, though we would deem them planted originally too thickly for a strong soil producing a rank growth. It is not at all amiss, however, to plant closely at first, and after realizing say three to six crops, thin out liberally; they will already have paid for themselves over and over.

The location of this vineyard is very high, with eastern slope, sheltered on the north and south; soil gravelly loam with slight admixture of clay; usually free from insects, though last year the cut-worms were very troublesome cutting out the buds. Great numbers of these pests were killed by night. The vines are cultivated early and continuously both ways. We deem it no small consideration in favor of this method, now growing into use more extensively among our vintners, of tying to single stakes, the important advantage of cultivating

both ways. There is also in this a very considerable saving of labor required for clean culture.

John Williams' Delaware vineyard, South Haven, located at an elevation of 110 feet, sloping south and west toward Lake Michigan, and distant from it one to two miles. The soil is clay "clear down," and is thoroughly drained, two feet deep at the distance of every twenty feet apart, with wood tile. It is an exceedingly strong soil, and well tiled, is finely adapted to the grape and other fruits. The subsoil is a stiff clay with the requisite amount of lime and iron.

This vineyard consists of two and a half acres of Delaware vines planted seven to nine years, eight feet by ten, all trained on the two wire trellis, running northeast and southwest—receives its pruning during the winter—producing big crops annually, and is highly creditable and profitable to the owner. We could but deem it worthy a premium for an exclusively Delaware vineyard, but unfortunately in this year's classification for premium entries, no provision is found for such award.

The Hiram Griffin, South Haven, Concord and Delaware vineyard, comprises 180 Concord on slat trellis, five feet high, and 140 Delawares on single stakes, all set 6x8 feet. This vineyard is eight years old, quite uniform throughout, with no vacancies. The Concord one year—1875—failed to ripen, and the following year, produced a light crop, but with these exceptions always had good crops. The Delawares succeed better, and have never failed of fair crops. In August this year they promised as finely as any in the State. But all varieties in this vineyard ripened late and unevenly, with phylloxera and oidium developed, if not to a degree to alarm owners, yet enough on which to predicate an early decay, unless arrested by change of treatment. The silent stealthy approaches of these insidious foes must not be allowed to catch our vintners sleeping at their posts, for they are no less deadly for stealing on unawares. The management of this vineyard is as follows: It is pruned in February back to two or three buds; he does not think bleeding hurts the vines.—plows both in fall and spring, to the rows in fall, and from them in spring; the soil is clay and without drainage, which may account for the late and uneven maturity.

L. G. Bragg & Co., Kalamazoo, entered their one acre of vineyard, ten years old, set 8x8 feet, three fourths Concord, and the remainder a selection, Delaware, Salem, Hartford, and others; soil, a sandy loam, but not very loamy, with a little gravel; it has a southeastern exposure, with timber protection on the northwest. Part of these vines are trellised, and the rest supported by stakes, preference being given to the trellis. The pruning is on the renewal system, cutting away all old wood to the ground, leaving four to six young canes to train fan-shaped, giving no other (or summer) pruning, except the removal of suckers. A shallow plowing is given in the fall, to the vines, and from them again the following spring; they are cultivated no later than July 4th. They claim as the result of this method every time with them, without fail, a fair crop of good bunches, and extra quality; never aiming at an extraordinary yield, that may overtax the vines, but making a point of quality rather than quantity. We noticed none of the oidium here, except on some of the Rogers' grapes. This vineyard has the benefit of a good market, Jackson and Kalamazoo furnishing a demand too great for the supply. The location is some hundreds of feet high, on old Asylum Hill, looking smilingly down upon the somnolent village below; beautiful 'Zoo, the "Sleeping Beauty."

We next present to your consideration the fine young vineyard of H. Dale Adams of Galesburg, near Kalamazoo, but no description can do justice to the appearance of this baby vineyard of two years old vines,—elegant in neatness and perfection of culture, and laden with fully ten pounds of splendid clusters to each vine, quite enough for its “two years,” though you can’t prove by us that it had not passed that mature age by some three or four months,—and the vines were two years old when set. Soil a rich loam, with gravel and clay below, and good natural drainage. It consists of 800 Concord vines, 10x10 feet, trimmed to a two wire trellis—with third wire to be put on next year—posts thirty-six feet apart, no vacancies, cultivates through the entire season, till fall; all right, perhaps, in his soil and location, but so much wood left, and fruit grown, is a heavy draft on young vines.

At Monroe we had the pleasure of examining the fine 3-acre vineyard of Jos. C. Sterling, which is 12 years old, nearly all Concord, and planted 6x8 feet. It is regularly pruned by the renewal system, cutting back clean to the ground all old wood, saving about four canes of new; tying all these up to first wire, the ends being bent over the wires and tied again. It receives no summer pruning; is cultivated till late in fall, and is then plowed to the vines with deep furrows, leaving a trench in the middle between the rows. He would trim at any or all times from fall to spring, beginning when the leaves drop, and continuing till April. Has always begun on the same side, and pursued the same order to the close, and has never been able to see any difference in the vines so pruned, either in the yield or condition. This is among the finest of the twenty odd vineyards at Monroe, and to add anything concerning the flavor or quality of the fruit would rightly be deemed superfluous. The soil is a very strong clay loam, tilled with thorough drainage.

Another Monroe vineyard examined was that of Joseph Sedlacek, containing near 1,000 vines, of Concord mostly, this being, in fact, the leading variety in most of the numerous vineyards of Monroe. We found in this lot 500 Concord, a small number of Catawbas, and some extra fine Delawares. The soil is sand scraped on and covering a black soil, underlaid with clay. A portion of this vineyard was but imperfectly drained, caused, perhaps, by some obstruction in the drainage. This is mentioned only as pointing to the results which were apparent in those particular rows, such as spotted grapes, a little mildew, and phylloxera more effectively; plainly showing that our grapevines require every possible aid and advantage in withstanding the assaults of these dread foes. Drainage and culture cannot be too perfect. These vines are pruned in winter, the old wood trained each way on a three-wire trellis. Well loaded in '77, but a light crop in '76.

The Leonard Reisig, Monroe, vineyard of forty acres, is principally Concord, too, with a light collection of Delaware, Diana, Catawba, Martha, Virginia Seedling and others. Showed grapes of most excellent quality, but not remarkable for quantity or size of berry or bunch. These heretofore had been chiefly used for wine manufacture, but of late there appeared to have been a falling off in this direction. These vines stand 8x8 feet, wire trellised, and located on the same low limestone ridge, with the celebrated Henrietta vineyard. It shows some vacancies, and plenty of the phylloxera, which seems to have preempted every cubic inch or fraction of an inch of soil even to the very center between the rows, in fact, as far as the roots extend, clear to the finest and remotest fibre and rootlet. His system of pruning preserves the old wood somewhat, spread each way, fan shaped, and indicates, perhaps, not so good results as the renewal system in same vicinity.

Adjoining the above is the six acre vineyard entered by John W. Reising, largely Concord, but with the rare addition for a Michigan vineyard, of 1,200 Norton's Virginia, it being, perhaps, the only location where that variety has been known to succeed so perfectly in Michigan, and even there it has not except on this particular spot we were informed. It is grown for the production of an extra choice brand of wine. But the bright hue of the ribbons worn by your committee, or perhaps might, could, or should have been worn, forbid the presentation of this ruby product in too high colors, or even a fair test and verdict upon the same. The menaces of the Red Ribbons threaten to come *down* on all who dare speak a word for the juice of the grape. It must not be so much as mentioned, or called pomological, or in any way connected with the objects of a pomological society. The must scale and saccharometer must be left to rust in unused cellars, the very grape aroma becomes almost a stench in the nostrils of the fastidious, the "true bouquet" must waste its sweetness on the air, unpriized and untested.

The vineyard to which was awarded the premium offered by the Michigan Pomological Society for the year 1877, is the one entered by Mr. Chas. Toll of Monroe, consisting of four and a half acres, nearly all Concord, and producing a crop of 20,000 pounds per annum of grapes, such as are found only at Monroe and vicinity, perhaps in all the State of Michigan. This vineyard is ten years old, and consequently just in its fullest prime and vigor. The vines are set at a distance of 9x9 feet, not overcrowded; are trained on a thoroughly substantial wire trellis, in perfect order, and manner faultless; the soil a strong rich clay loam, well tilled two and a half feet deep, as closely as every twenty feet. The pruning is done in February, cutting to two short arms only one foot long, and these cut off once in a few years. Four young canes are grown from those and trained for fruiting, and a little summer pruning is given, and clean thorough culture; and although phylloxera has existed there these many years, yet under these favorable circumstances, and this fostering management, these vines are enabled to endure their most persistent and unyielding attacks with almost entire immunity from harm. But were the superb vineyards of Monroe allowed to suffer from negligent culture, lack of drainage, or any damaging treatment, allowing any falling off in vigor, then the injurious effects of these pests would be immediately apparent; perhaps no variety of grape is entirely exempt, none less so than the Clinton and the indigenous wild grapes.

At Monroe and vicinity the grape is so extensively grown as to have become a principal industry. Yet the quantity grown is so great that their vintage, though of unrivalled quality, is sold to the trade at three to five cents a pound. But the yield is so enormous as to bring in some cases \$250.00 to the acre at these low prices.

THE PREMIUM CHERRY ORCHARD.

Your committee on the cherry orchards entered for premium in 1877, respectfully report as follows: In the classification for this year there was but one premium offered for cherries in this division. Almost at the very outset of our labors we encountered that famous cherry orchard of Mr. Geo. Parmelee of Old Mission, Grand Traverse county, which all competitors will find so very hard to get away with, and need not be at all surprised if they get left when Mr. Parmelee has entered in competition. This orchard consists of only 200 cherry trees, in full bearing, and is not separated by even a fence from his other orchards, of 115 acres of miscellaneous fruits in one body. It comprises

a most judicious selection of the choicest varieties of cherries, every one of them appearing quite at home in that soil and location, finding it entirely congenial, recking little that many had supposed it too far north for these fine, delicate fruits. The May Duke rather holds a preponderance in this collection, proving highly productive, profitable, and hardy. Next to this ranks the English Morello in relative importance and profit; the others ranking in the following order, viz.: Elton, Yellow Spanish, and Black Tartarian. From the first two fine old standard varieties named, the bulk of his crop at present is produced; the Early Richmond being entirely discarded as too poor a fruit to be recommended or adopted among fruit-growers. He would not have such a cherry on his place, or offer it in the market: "would not pick it if he had it;" it was even too poor for the birds. In presenting before you the views expressed, and the relative estimation of different varieties, as well as the practice and methods of practical fruit-growers in different parts of the State, we give you valuable, and, we trust, acceptable facts and information of far more worth than mere theories or book studies. He cultivates, in hoed crops, till first week in August.

The selection in this cherry orchard is about as follows: 125 May Duke, 30 English Morello, 25 Elton, and 12 Yellow Spanish, with a few old trees of Black Tartarian and Knight's Early Black. The Early Purple Guigne, are all killed out, while May Dukes in same location escaped unharmed. He would have no fears of Tartarian, Yellow Spanish, and the fine class of Heart and Bigarreau sweet cherries winter-killing there, except in hollows or low places. These cherry trees have borne all they could stand ever since they commenced bearing, at two years from planting. And your committee beheld them laden with the crop of 1877, and truly it was a joy and a beauty, and words would fail to portray. They had just begun gathering the crop of English Morellos, the average of the whole being a fraction over one bushel per tree. This orchard had been planted only from 4 to 8 years, at the longest.

He first tried the Chicago market in 1877, and realized \$5 per crate of 24 quarts. Cost of transportation 12 cents a crate, or one-half cent a quart. Picking cost one cent per quart, leaving a fraction over 18 cents net in Chicago. They are picked by cutting the stem in the middle with scissors, leaving all berries unbroken, they remaining sound a long time in this condition. We saw the Yellow Spanish in a well preserved condition kept ten days in the common berry box, and saw fine May Dukes there in August. They are never troubled with the rot or scald there, nor insects injuring the cherry. Birds preyed a little upon early varieties; killed some 300 cedar birds, known as the cherry bird, also a few bluejays,—the robin being not so bad a fellow there. Other cherries were plentiful in market at 8 cents, while these were selling readily at 18 to 19 net. They must surely be beautiful beyond belief almost. The picking is done by girls, who pick 80 to 90 quarts each in a day. (Moral: cherries should be picked by girls.) He counsels by no means to shorten in; always leave the terminal bud: no pruning the cherry, nor touch of the knife to the tree where it can be avoided, and would not have trees that had lost the leader in the nursery.

The cherry orchard of J. G. Ramsdell of South Haven: 110 trees two years planted, except 30 Early Richmond set one year. It comprised the following selections: 30 Early Richmond, 20 Black Tartarian, 20 Rockport Bigarreau, 10 May Duke, 10 Louis Phillippe, five Gov. Wood, five Napoleon Bigarreau, and five Reine Hortense.

These trees are pruned up to high heads four feet; also headed back half of

the new growth. The soil is good,—a sandy loam with clay below,—but part of the land is too low for cherries, but perhaps is good enough for the Richmond; any soil ought to be, it is believed. Mr. Ramsdell cultivates till August. Summer pinching to northeast to preserve a balance. Two rows of currants are grown between the cherry rows each way, to be thinned out when they shall become too crowded. These comprise 420 Victoria, 200 Red Dutch, and 200 Black Naples currants. Your committee can hardly commend either the selection, situation, or treatment of this orchard as a whole. Our time and limits will not allow us to enlarge farther on the cherry report. But we must notice the great, sound, uninjured trees of some of the sweet cherries, Yellow Spanish and other Bigarreaus, which we found at wide intervals in different parts of the State, measuring from 2 to 4½ feet in circumference and 25 to 40 feet in height, and bearing five to ten bushels of fine cherries per annum. Mr. Jos. Wetmore of Allegan county showed us one of these remarkable cherry trees, with the remark that “it has produced more fruit than a span of horses could draw.” It was called a Yellow Spanish, had never been cultivated at all from the time since planted. And we cannot leave unnoticed the fact that every cherry tree like the above found by the committee had likewise never had cultivation. But the fact that we have such cherry trees as the above is a sufficient refutation of the plaint that these best sweet cherries must be given over: it indicates that our cherry trees are killed by culture. The same is true of pear trees.

A. G. GULLEY'S REPORT ON PEACH ORCHARDS, GARDENS, ETC.

The first peach orchard that we examined was that of J. G. Ramsdell, at Traverse City, 100 trees of Hale's Early, two years old, situated on an east slope, the soil gravel and sand, and the trees 12½x16 feet apart. The land has had wheat or clover on it since the trees were planted. They were heavily mulched with coarse straw at the time of planting. This seemed to give them a more healthy growth, as another lot near were not mulched, had a weaker growth and pale foliage. The mulch retained the moisture and kept the wheat from growing close to the trees. The orchard entered had generally made a fair growth, and was nearly free of borers. It is headed about two and a half feet high. Each fall about one-half of the year's growth is taken off, and the limbs somewhat thinned out. The past year half a bushel of unleached ashes has been applied to each tree. Mr. Ramsdell informed us that Hale's Early does not rot there, and it seemed to do better than farther south. He had tested several varieties, but would not plant anything ripening later than the last of August. Had not yet fruited any of the extra early varieties, but thought they would be valuable there. As yet would plant nearly all Hale's. The cut-worms are very troublesome, and he protects his trees by tin bands placed around them at the root, the ends hooked together. This orchard was entered not so much for premium, as to draw the attention of the committee to what can be done with peaches in that northern country.

At Old Mission, twenty miles north of Traverse City, we saw Hale's Early in full bearing, but at present very few peach trees are planted. Judging from the trees we saw there, and the fruit they exhibited at the State Fair they have reason to be encouraged, and can probably grow at least all required for the home demand.

Our next call into peach orchards was at Blackberry Ridge, Oceana county.

and the first visited was that of L. Chubb, a young orchard of 125 trees, the second year set, and one rod apart each way. This, like nearly all the other young peach orchards at this place, had apple trees alternating with peaches, in every other row, to have an apple orchard when the peaches fail. The trees are headed about three feet high, and all alive and growing well. He had 100 Barnard, 10 each of Early Beatrice and Louise, and five Alexander. Several of the latter varieties bore one or more peaches the present year. The soil is a sand and limestone gravel for some depth. The orchard is 125 feet above the lake, about half a mile from the shore, and has a gradual slope toward it; and although so high above the water, is in a valley between high hills on the north and south. It is all inter-planted with raspberries and strawberries in hills, all growing well. The trees were in a thrifty condition, but were headed too high, a fault that all the committee condemned. Mr. Chubb gives clean cultivation till the first of August. He would plant nearly all Hale's and Barnard, as later varieties seem to be shy bearers. He had this orchard nearly all Barnards, as he had an older one largely Hale's, which bore a good crop in 1875, after the cold winter.

C. A. Sessions had 100 trees entered 4 years old, 25 each of Hale's and Crawford's Early and 50 Mountain Rose, set one rod apart with apples alternating. The soil—sand and gravel, with some red clay in the subsoil. This orchard had been neglected both in cultivation and trimming. Some of the trees are badly crotched and others out of shape, and although old enough to bear some, we were unable to find fruit enough to identify varieties. Had a crop of buckwheat on the ground at time of our visit. It will probably have better care in the future, as it is now in the hands of a man interested in the business.

We next looked at two orchards of bearing trees, the first that of Charles W. Gay, nearly 20 acres, largely Early Crawford, with some Hale's and Barnard, all six years old. The trees had borne but little fruit, and had on only a small crop this year. The trees were healthy, but had been trimmed very little. His general cultivation was to plow twice each year. The orchard had a very favorable location, and if it ever bears good crops must prove very valuable to the owner. The other orchard belonged to G. H. Sammons, situated on the lake shore, 60 feet above and sloping toward it. There are 90 Early Crawford, 25 Hale's, and 10 Late Crawford. The latter seldom ripen. The soil is sandy for some depth. The trees never had much care, yet are in fair shape and headed low. He has usually grown crops among the trees,—potatoes this year. They had a good crop, in 1875 the Hale's alone yielding \$110 worth of fruit. This orchard presented the best appearance of any one we saw at this point. He had a young orchard alongside of 700 trees, all Hale's and Barnards, also looking well.

We found all the orchards at this place in the hands of men that intend to do the best they can with them, and any mistakes or neglect in the care was due to the lack of knowledge rather than inattention. The trees in all the orchards looked healthy and were very free from insects, but the error of heading too high and planting too close was observed in nearly all. As to the inter-planting of apples, the committee think location would have much to do with deciding that matter.

Having no other entries of peaches on the lake shore until we reached South Haven, our next stop was at that place to examine six entries,—four of young trees and two bearing orchards. D. M. Shoemaker had 300 trees second year's set, and 20 feet apart each way. The varieties were about 50 each of Early

and Late Crawford, Snow's Orange, Jacques' Rareripe, and Hills' Chili, and 25 each of Hale's and Early York. There were but two trees missing in the block. The soil a strong clay loam with clay bottom. The trees high-headed but well balanced, and of good shape. All show the best of care, and the choice of varieties very good for the section. This orchard takes a high rank in its class, and has many points to recommend it.

L. H. Bailey entered 300 trees third year set. About equal each of Early and Late Crawford, Jacques' Rareripe, and Stump the World. The trees are set 20 feet apart and headed three feet high. They have a good growth, having been manured once or twice since planting. The soil is clay and gravel. A crop of corn has been grown each year among the trees. The principal objections are the high heads, and one variety,—Stump the World,—is not very desirable for that place.

J. J. Atherly entered 300 trees two years old, set 16 by 20 feet. Soil, a clay loam with stiff subsoil. The principal varieties are 75 each of Old Mixon Free and Hill's Chili, and 25 each of Early Crawford, Jacques' Rareripe, and Barnard. He has grown hoed crops each year among the trees. They are headed about two feet high. Some of them had bad crotches. The orchard is cut back each year about half the growth. It has a very favorable location, and ranks well with nearly all the others entered.

The last young orchard visited at this place was that of Joseph Lannin,—500 trees three years set, and 20 feet apart. The soil sandy with a clay subsoil, and having a gradual slope to the east. A few places in the block were filled with younger trees where the mice and rabbits had killed those planted at first. The varieties are 150 each of Early and Late Crawford, 50 Jacques' Rareripe, 35 each of Old Mixon and Hill's Chili, 25 each of Barnard, Foster, and Early York. All are planted in the order of their ripening. The trees have been well cultivated each year until the first of August, and, except this year, a crop of corn grown on the ground, but no crop this year, as the trees occupy a good share of the space. They are headed low, pains taken to keep a leader, and have them well balanced. Many of the trees are bearing this year, some as high as three baskets. The principal pruning thus far has been to thin out the limbs and keep the balance of the trees.

Mr. Lannin has the credit, among his neighbors, of sleeping in his orchard, as he spends so much of his time there, giving it his personal care. I obtained from him, as near as he could give it, the actual cost of this orchard to the present time. It is as follows: For trees, \$80.00; for cultivation, \$220.00; interest on value of land and cost of trees, \$140.00, or a total of \$440.00. The corn grown on the land he values at \$90.00, and he took \$75.00 worth of fruit this year, so the actual cost to him thus far has been about \$275.00. A very moderate crop next year will put the balance a good deal in his favor. Your committee had no hesitation about awarding this orchard the first premium in its class. Mr. Lannin has on his place nearly 2,000 peach trees of different ages, a large young vineyard, and pear orchard, and is planting more every season. His prospects for plenty of work and profits, too, are very good.

The two bearing orchards entered here are those of C. T. Bryant and H. J. Linderman: the first about 200 trees, from seven to eleven years old, and the winner of the first premium two years ago, as it then bore a good crop. The trees had a full crop this year, but many were injured by a heavy ice storm, in the spring of 1876, many limbs being broken off, and in some cases whole trees destroyed. The principal varieties are: Hill's Chili, Barnard, Keyport White.

Hale's and Early Crawford. The soil is a clay, loam and the situation very good. Mr. Bryant spends a great deal of his time in his orchards, and the effect is shown in the healthy and well grown trees, as well as in the returns he receives for his fruit. Mr. Linderman's orchard embraced 1,200 trees from four to eight years old, a part of which won a premium two years ago, as a young orchard. The soil is sand and clay mixed. The effect of the ice storm was visible here on some of the trees, some large limbs had been broken off. The oldest part of the orchard is high headed, but this error has been corrected in the later plantings. We noticed but few vacancies in the whole block. The trees are set 16x20 feet. The varieties are 200 each of Barnard and Hill's Chili, 175 Jacques' Rareripec, 150 Early Crawford, 100 each of Late Crawford and Old Mixon, and 50 George the Fourth. He would put in more Jacques Rareripec and Hill's Chili, and less Barnard, if planting again. He heads back about half the new growth each year, and takes off a large portion of the fruit that sets; gives clean cultivation till August first, then sows to oats which grow up and act as a mulch for the winter. This orchard was deemed well worthy of the diploma awarded it by your committee. The following are some figures received respecting this orchard: Has owned it four years. The first year sold the crop on the trees for \$600.00. The second year, 1875, the crop nearly failed, had about 100 baskets worth about \$100.00. In 1876 sold 2,800 baskets, which netted over \$1,000.00. The past year 3,660 baskets have been shipped, beside about 300 more taken to dry house, and the net profit is a little less than \$2,000.00. The cost of cultivation the first two years was about \$200.00, last year \$200.00, this year \$320.00.

All the entries at this place gave evidence of the care and practical knowledge of the owners, and the result of the discussions at the weekly meetings of their local society was to be seen in the healthy and well cared-for orchards on every side.

At Paw Paw we found three entries, two bearing orchards, and one of young trees. The first, that of A. Engle, 400 trees from seven to nine years old, set 16x20 feet apart. Two-thirds Late Crawford, and the rest Early Crawford. The soil is a gravel and sand, with a clay subsoil, and well elevated, which is the protection of the orchard. The trees are headed back each year. At the time of our visit had on a fair crop. The orchard generally looked thrifty, but the trunks were rough and gummy, and the work of borers was to be seen. It was manured some each year, and the plow and cultivator used in it all the early part of the season. It averages full crops about two out of three years.

C. Engle entered 1,100 trees, fifteen years old, Early and Late Crawford, Hill's Chili, and Barnard, the principal varieties. The soil clay, with some gravel. These trees were bearing a full crop, but in general appearance would not compare with others visited, not even with that of his brother just mentioned. But it has been a very profitable one. During the last eleven years it has netted, above all expenses \$2,125.00 for each acre, or nearly \$200.00 for each year.

Mr. Engle also entered a young orchard of 1,800 trees, 500 Smock Free, 350 Hale's Early, 300 Alexander, 200 each of Late Crawford and Honest John, and 100 each of Amsden's June, and a seedling of Early Crawford raised by himself, very much like its parent, but earlier. This orchard is on clay soil, very rolling, is two years old, and is looking well. The healthy appearance of these trees as well as the profits of the old orchard seem to justify Mr. Engle in planting very largely of the peach. The high elevation of the land here seems to make the situation a very favorable one. We were informed that over

30,000 trees were planted in the vicinity the past year, and all are doing well. One peculiarity noticed here was the forwardness of the fruit: every variety was at least ten days earlier than on the lake shore, only twenty-five miles west.

The last entry in this class was that of N. E. Smith, at Ionia, situated on a clay soil, elevated 200 feet above the river. There were a good many vacancies, killed by the cold winters. 400 trees were planted 16x16 feet. The winter of '72 and '73 injured the tops of some very much. These he cut back very close the next spring, and now have a good, thrifty top. On most kinds there was a fair crop this year. His market is in Ionia, and the orchard has usually paid well. He did not expect to successfully compete with the orchards on the lake shore, but wished to have it examined and have any hints or suggestions given that might help him in its future management. It was the only peach orchard examined in the interior of the State, and we think Mr. Smith should be satisfied with his success.

FRUIT GARDENS.

Under the head of fruit gardens the committee examined three entries. The first, S. Chubb's, at Blackberry Ridge, consisted of Doolittle raspberries and Wilson strawberries, embracing about four acres, the whole grown on the hill system. A part of it is in the young peach orchard already described, the rest among plums. This is the first year of the strawberries, but a part of the raspberries are in full bearing, yielding this year over 90 bushels. The hills are four and eight feet apart, and it gets the same care as the trees. The principal points in favor of this entry is in fully occupying all the ground until the trees get to bearing, and no doubt a better quality of fruit will be obtained by growing the berries in hills.

H. E. Bidwell of South Haven entered a fruit garden of 10 acres. First all planted to cherries and plums, 500 of each, 20 by 20 feet apart. This the second year set. On seven acres there are two rows of raspberries in each space between the rows of trees, and currants and gooseberries on the other three; all these are to remain five years. Between the rows of trees and raspberries are planted several varieties of strawberries, to remain three years. In all the spaces in the rows of trees and between the rows of raspberries, vegetables and cuttings are planted, so the whole ground is occupied, having a row of something about every three and a half feet. The soil is a mucky loam, with clay subsoil, all well underdrained. Of varieties of cherries there are 200 Black Tartarian, 100 each of Gov. Wood and Rockport Bigarreau, and 50 each of Early Purple Guigne and Louis Phillippe. Of plums, 140 each of Bradshaw and Canada Egg, 100 each of Lombard and Coe's Golden Drop, and 20 of other sorts, all one year old when set and headed at one foot high, and all have grown from three to five feet the past season. He has of raspberries 10 rows each of Herstine, Kirtland, and Brandywine; four each of Doolittle and Mammoth Cluster, two of Davison's Thornless, and one Turner. Of currants there are 12 rows of Black Naples and six of Victoria. Two rows of Houghton and one of Downing gooseberries. Of strawberries there are six rows each of Col. Cheney, Triomphe de Gand, Seneca Chief, Monarch of the West, Wilson, and Centennial, the last a seedling of his own. For the list of vegetables we refer you to any seedsman's catalogue. Nearly every variety was represented there. Everything in this block showed the best of care. All cultivation was stopped the first of August. Mr. Bidwell furnished me with a statement of the expenses and receipts up to the present time, which are as follows: Cost of land, \$750; clearing, fencing, and breaking up, \$120; draining, \$142; 1,000 trees

and setting, \$275; berry and currant plants and setting, \$290; cultivation first year, \$50; second year, \$60; straw for mulching, \$12; interest and taxes, \$210, or a total of \$1,909. The receipts the first year were: Berries, \$90; vegetables, \$160; berry plants, \$56; second year,—berries, \$364; vegetables, \$226; currant and berry plants, \$390, or a total of \$1,226, leaving the expenses thus far about \$680 more than the receipts, which another year will more than clear. The committee very willingly awarded a diploma to this plantation.

A FRUIT GARDEN OF H. B. CHAPMAN,

Reading, Hillsdale county. This place consists of about two acres in the village named above. To begin with, the soil is naturally excellent, and it has been kept in good condition. The place contains about 80 pear trees of 30 varieties, a few apple trees, peach trees, apricots, currants, gooseberries, raspberries, strawberries, grapes. Among these was a large assortment of vegetables,—sweet corn, potatoes, cabbages, cauliflower, turnips, beans, peas, popcorn, celery, cucumbers, muskmelons, watermelons, tomatoes, sage, asparagus, horseradish, sweetpotatoes, squashes, etc. The trees and shrubs generally looked in good health; the vegetables were well grown. How much better many of our best farmers would live, and how much more attractive home would be to all the family, if each had a good garden well supplied with such a variety of products. Mr. Chapman understands how to keep a garden clean in the easiest way: that is to hoe or rake, or cultivate the ground in some way, once a week, or oftener. The ground was all occupied with something.

The committee had their attention called to one plat of raspberries that bore such large crops that they thought it worthy of an award. It was a plantation of Philadelphias of an acre and a half, belonging to Reynolds & Tracy, at Old Mission, planted in the spaces of a young apple orchard, the plants two and three years old, and set 3 by 6 feet. At the time the committee were there, at a very moderate estimate, there were 150 bushels of fruit on the bushes. This piece had received the first two years just cultivation enough to keep it clean; this year it had not been touched. Such large canes and fruit I never saw elsewhere. Several rows had small logs laid along each side, and the intention was to fill the space between with leaf mould from the forest, but this had not yet been done. The logs alone seemed to add to the size of the fruit, probably acting somewhat as a mulch. There was one drawback to the value of this plat. They have no near market for all the fruit. It was planted intending to dry it, but this did not prove profitable, so much of it is wasted. That country is noted for the quantities of very fine wild red raspberries which grow there.

It is to be hoped that some profitable means of disposing of this fruit may be found, for that region seems to be the home of the red raspberry.

MICHIGAN NURSERIES.

At Kalamazoo, the committee spent a day looking over the nursery stock of L. G. Bragg & Co., and we were very agreeably surprised at the condition of it. Block after block of apples, as fine as could be grown, not less than 75,000 ready to send out this fall and next spring, with the desirable sorts in an unusually large proportion, all healthy, and of good size. The same can be said of the cherries, pears, and peach. Of evergreens they have a large stock, especially of varieties and sizes suitable to plant for screens. They are themselves using a good many for this purpose to protect their stock in the winter. The ornamental department is well supplied, embracing a good variety of the hardy

trees and shrubs, desirable in this State. Here we found cellars in which to heel in stock during the winter, keeping it safe, and ready for early spring shipping, or, if need be, keep it back for late planting. The fruit growers of Western Michigan have no need to go far for trees.

We also spent a day looking over the extensive establishment of I. E. Igenfritz & Sons, at Monroe. Here we were taken over farm after farm of stock of all kinds and at all stages of growth from the seedling to almost bearing trees. In this nursery are employed twenty-five hands and eight teams during the ordinary working season, and a much larger force during the time of packing and planting. To attempt to describe or enumerate the stock would be out of the question here, every department being very full. In the ornamental grounds we noticed very many rare and desirable plants. This firm have a very fine arrangement of packing houses, and extensive cellars in which to heel in stock, and all the land upon which it is grown is thoroughly prepared and under-drained before planting is begun.

We also called upon Reynolds & Lewis at that place, but the proprietors were absent. However, a short time spent in looking over their stock showed it to be very complete and in fine order.

Your committee take pleasure in recommending any of these to those wishing to purchase trees. Nor are these all. At other places in the State nursery stock is grown, and by reliable men. There is no need for the people to go either to the east, south, or west for nursery stock. It can be obtained at home, and of quality or quantity to suit any purchaser.

The full report of the orchard committee having been completed, the society next listened to a paper on

THE NUTRITIVE VALUE OF FRUIT AS COMPARED WITH OTHER FOODS.

BY R. F. KEDZIE.

Much has been written on the value of fruit as food. Many articles that appear in the agricultural columns of the newspapers, state that the use of fruit is essential to perfect health: that the reason why the farmer suffers such poor health as compared with those of other occupations is, that fruit does not take a prominent place among his articles of diet; besides the food of our first parents in the Garden of Eden was largely fruit, and the nearer we gravitate back to the first condition of things, in this respect, the better health we shall enjoy.

There is undoubtedly a good deal of truth in all this; and taking nothing for granted, let us go a little deeper into the subject, and consider briefly the value of fruits in the human economy.

By fruits, we do not mean everything to which a strict scientific definition would apply, but only such as are popularly included under that term, such as apples, peaches, pears, strawberries, etc., and by food, to adopt Dr. Smith's definition, we mean, a substance which when introduced into the body, supplies material which renews some structure, or maintains some vital process. Now leaving out of this discussion the office of various constituents of foods,—as to which are "flesh-forming," or "force-giving"—questions that are not settled to-day, let us glance at the composition of fruits, and then consider their nutritive value.

The following are a few of the numerous analyses by Professor Fresenius, of ripe fruit:

NAMES.	PERCENTAGE OF					
	Sugar.	Free Acid.	Albuminous Substance.	Pectinous Substance.	Soluble Matter.	Water.
Apples.....	6.83	.85	.45	.47	14.96	82.04
Peaches.....	1.580	.612	.463	6.313	9.39	84.99
Pears.....	7.00	.074	.26	3.281	10.90	83.95
Apricots.....	1.531	.766	.389	9.283	12.723	82.115
Heart Cherries.....	13.11	.351	.903	2.286	17.25	75.37
Green Gage.....	2.96	.96	.477	10.475	15.19	80.841
Austrian Grape.....	13.78	1.020	.832	.498	16.49	79.997
Cultivated Strawberries.....	7.575	1.133	.359	.119	9.666	87.474
Wild Strawberries.....	3.247	1.650	.619	.145	6.398	87.271
Cultivated Raspberries.....	4.708	1.356	.544	1.746	8.835	86.557
Wild Raspberries.....	3.599	1.980	.546	1.107	7.500	83.86
Blackberries.....	4.444	1.118	.51	1.444	8.000	86.406
Mulberries.....	9.193	1.86	.394	2.031	14.043	84.707
Red Gooseberries.....	8.063	1.358	.441	.969	11.148	85.565
Red Currants.....	4.78	2.31	.45	.28	8.36	85.84

From this table it appears that different fruits vary considerably in composition. Some kinds are very rich in sugar, while in others there is a much larger relative amount of acid present. We cannot judge of the amount of sugar present from the taste of the fruit. A sour apple may contain no less percentage of sugar than a sweet one. In the former case the sweetness is masked by a relatively larger amount of acid. The sourness of currants and gooseberries is owing to the large amount of free acid they contain.

The amount of sugar in fruits is largely increased by cultivation. An examination of the above table shows that the percentage of sugar is more than doubled in the cultivated strawberry of that in the wild.

How nutritious are these fruits as materials for food?

Dr. Edward Smith, the great English authority on foods, states that the least amount of food upon which an adult person can subsist in good health in idleness,—in other words a famine diet,—is food containing 190 grains of nitrogen, and 4,100 grains of carbon per day. If we take this as a standard, and from the composition of fruits calculate the number of pounds an adult person would consume in a day of fruit, provided the person ate one kind of fruit to the exclusion of every other food, we should have the following amounts:

Fruits to Sustain Life One Day.

FRUIT.	Number of Pounds for Nitrogen.	Number of Pounds for Carbon.	FRUIT.	Number of Pounds for Nitrogen.	Number of Pounds for Carbon.
Apples.....	37.7	8.8	Strawberries.....	47.2	16.2
Pears.....	60.0	10.3	Grapes.....	20.4	7.1
Peaches.....	36.7	9.0	Red Gooseberries..	38.5	12.4
Apricots.....	43.6	13.5	Raspberries.....	31.2	17.0
Green Gages.....	35.6	8.6	Red Currants.....	37.7	14.2
Heart Cherries....	18.8	8.8			

From this table it appears that an adult to enjoy good health, if he lived upon fruits alone, must eat 37.7 pounds of apples, or 60 pounds of pears, or 36.7 pounds of peaches, etc. The numbers in the second column simply indicate the amount that an adult must eat to acquire enough carbon alone.

Let us now glance, for the purpose of comparison, at the number of pounds of any one of our standard articles of food that will sustain an adult for one day in idleness.

Food to Sustain Life One Day.

FOOD.	Number of Pounds for Nitrogen.	Number of Pounds for Carbon.	FOOD.	Number of Pounds for Nitrogen.	Number of Pounds for Carbon.
Fat Pork	1.80	.99	Egg	1.30	3.20
Dried Bacon	2.00	.68	Wheat Flour	1.60	1.50
Lean Beef .....	.90	4.50	Baker's Bread	2.20	2.60
Fat Beef	1.20	1.50	Indian Corn Meal	1.60	1.40
Lean Mutton	1.00	4.20	Rice	2.80	1.50
Fat Mutton	1.40	1.50	Potatoes	8.60	5.30
Veal	1.10	2.30	Carrots	13.60	8.10
Poultry .....	.84	4.20	Parsnips	15.90	7.40
White Fish .....	.97	4.70	Turnips	14.60	15.60

These figures are only approximate. Both fruit and foods proper vary considerably in composition. It is not to be supposed that a person would attempt to live upon fruits, to the exclusion of every other kind of food; but these tables are of interest as showing how far fruits may replace other foods; and simply considering the great weight of fruit that must be eaten to acquire sufficient nutriment, it will be seen that the replacing power of fruit is very small indeed.

Fruits do not rank high for repairing and building up the human body. According to one of the best English authorities, an egg weighing 794 grains, and containing 17 grains of albuminous matter, is equivalent in nutritive power to 17 ounces of cherries, 22 ounces of grapes, 30 ounces of strawberries, 40 ounces of apples, and 4 pounds of red pears.

In making this comparison, I am not attempting to disparage the value of fruits in the human economy, but only to put them in their proper place. They are chiefly of value for the soothing influence of the pectin and gum they contain, for the presence of free acids and alkaline salts, their aroma (to which much of their refreshing quality is due), and the varying amount of soluble matter present. Those fruits that seem to "melt in the mouth" contain a large amount of soluble matter.

Next to those foods that are of direct use in nourishing the body, is probably the place where fruits should stand; and although chemical analysis may show that, as compared with other foods, they lack in richness, still their use is almost essential to perfect health. There are no foods, with possibly one or two exceptions, that are alone fitted to sustain life. A person fed on starchy or nitrogenous foods alone will certainly starve to death in time, or be attacked with starvation diseases, of which the most loathsome is scurvy. Up to the close of the 18th century more men perished in the navies of the world of scurvy than by the cannon shot and sabre stroke of the enemy. On this subject a recent authority says: "Sir Richard Hawkins, the great navigator of the age of Elizabeth and her successor, said that in the course of twenty years

'he had known of 10,000 seamen having perished by scurvy alone.' Even so late as 1780, Sir Gilbert Blane found that a fleet, manned with between 7,000 and 8,000 seamen, had in one year lost one in every seven. * * * A Portuguese historian cited by Sir Gilbert Blane, speaking of the favorable case of an exploring expedition, says 'that if the dead who had been thrown overboard between the coast of Guinea and the Cape of Good Hope, and between that cape and Mozambique, could have had tombstones placed for them, each on the spot where he sank, the way would have appeared one continuous cemetery.'

Even so late as last year a British ship, fitted out with every appliance of science, was sent to explore the Northwest Passage, and the Polar Sea, but was compelled to return, having totally failed of its object, driven home by scurvy, and all for the want of lemon juice or acidulous fruits. Scurvy is the bloody lash that hangs over every ship, whose commander forgets or neglects the essential elements of human food.

But while there is probably no danger of our being attacked with the scurvy, would not people enjoy better health if fruits occupied even a small place in the dietary system? At present, is not the food eaten by the great majority open to criticism? During the greater part of the year, summer and winter alike, the only meat eaten is fried pork. The result is, say our best physicians, that dyspepsia and diseases of the digestive organs generally, are quite common. It has been said that "Americans worship too often at the throne of the Great American Spider (*Frypanus Americanus*), who numbers more victims than war, or pestilence, or famine!"

Fruits act as a gentle laxative to the system, tending to correct the excessive use of meats and other highly seasoned foods.

Concerning the king of fruits, the apple, the *Christian Advocate* says:

"There is scarcely an article of vegetable food more widely useful, and more universally liked than the apple. Why every farmer in the nation has not an apple orchard where the trees will grow at all, is one of the mysteries. Let every housekeeper lay in a good supply of apples, and it will be the most economical investment in the whole range of culinaries. * * * The most healthful dessert that can be placed on the table is a baked apple. If eaten frequently at breakfast with coarse bread and butter, without flesh or meat of any kind, it has an admirable effect on the general system, often removing constipation, correcting acidities, and cooling off febrile conditions more effectually than the most approved medicines."

In concluding this part of our subject it should be added, that while fruits are not in themselves very nutritious, they assist greatly in the digestion of other foods, and are second in importance only to more nutritious foods. They are the "open sesame" to good health, without which life is not worth the living.

As fruit constitutes so important a part of our diet, its proper preservation becomes a matter of the utmost importance. There are two methods of preserving fruit employed; viz.: canning and drying. The first method is too expensive to bring fruits into very common use, and many fruits put up in so-called "tin cans" are said to be injurious to health. Prominent physicians have reported that the tin used in making cans is adulterated with lead, and that paralysis from lead poisoning has been the result in certain cases from eating fruit put up in these same cans.

The most common method is by drying; and if fruits could be preserved in

this way while retaining all their sweetness and color, the demand for them would be greater than the supply. Already our foreign friends are beginning to appreciate the value of American dried fruits. The Country Gentleman of Nov. 29th, 1877, says: "American dried fruits to the value of \$2,500,000, were sold in the last twelve months in Europe. An English correspondent of one of the American papers says that our dried fruits, especially our dried apples, are coming into use among the lower classes, such as the artisans, in the large manufacturing towns; that dried apples would come into more general use if they were more abundant and of better quality. Fresh fruit is too costly for their use; almost the only fresh fruit that comes on the artisan's table is the gooseberry, which is especially cultivated by weavers, who have made this short-lived fruit their favorite for cultivation and competition. If dried apples of superior quality could be supplied in quantity so prepared that they would keep like raisins, they would become an article almost as staple as wheat for exportation to northern and central Europe. The vast artisan class would buy them as regularly as they now buy their "penny-worth o'tea." The enormous crop of apples that as last year glutted the markets of this country, and were a burden to the producer, might become a blessing to half the globe. The perishable nature of apples and the large amount of water they contain, makes them both a risky and expensive article to export. They may be so dried as to remove all risks, the expense largely reduced, and when cooked be as palatable as fresh fruit. Such fruit will yet make for itself a market in all parts of the civilized world outside the tropics."

But much of our dried apples as seen in the market are "fly-specked," wormy, of a deep brown color, and when made into sauce an exceedingly poor article of food; and although the Alden and other processes have done much to improve the quality of dried fruit, there is still room for improvement.

The brown color of dried apples is undoubtedly owing to the action of ozone present in the air; for if pared apples be exposed in an atmosphere charged with ozone, they speedily acquire a deep brown color. Air may be deprived of ozone by heating it to the temperature of 450° F. Could not apples be dried in an atmosphere freed from ozone by passing the air over a hot fire, and then cooling it to a certain extent before reaching the fruit? I have not worked out the details of this process, but have no doubt that the fruit drying process of the future will guard against the influence of ozone, and furnish us with dried fruit, as sweet and wholesome as fresh fruit, and differing from it only in containing less moisture.

After some further explanation of tables and figures, in answer to questions by Mr. Kedzie, the audience listened to the following

REPORT OF THE SECRETARY FOR 1877.

Gentlemen of the Michigan State Pomological Society:

At this annual meeting, when so many of the members are gathered in council, it seems natural that some account of the operations of the Society should be considered, that we should halt a little and allow the work accomplished to pass in review, and judge whether for the time, labor, and money expended there is value received in results. As the operations of the Society throughout the year largely hinge upon the work of the Secretary, I shall make this principally an account of my own work, giving here and there the results as they become apparent in the history.

COLLECTION OF REPORTS.

At the annual meeting in Coldwater one year ago quite an important resolution was passed by the Executive Committee, and one which involved an indefinite amount of labor to continue through the whole year of 1877. I give it in full:

“Resolved. That the Secretary be instructed to secure as soon as practicable, two hundred copies of each volume of our Reports already issued, or as near that number as may be, and that he keep an exact record of volumes received and disbursed.”

Upon coming into the office of Secretary, there was not a complete set of volumes on hand, so that the work began at the bottom, without even a nucleus. There should be no blame resting upon my predecessor, nor upon any one for this state of things, for the Society in its poverty had no place in which to preserve a single copy of our reports, and there was no way to do but send them out where they would do the greatest amount of good. I presume Secretary Thompson preserved for awhile a few copies of the volumes—such as he could carry with him, but with the constant call for these, which it is impossible to resist, they would not last very long.

And I wish to call the attention of the Society to the fact that the above resolution was unanimously passed when there was no place to deposit the volumes should the Secretary be so fortunate as to secure any. It was trusting a good deal in Providence to provide a place, but it was necessary that somebody have a few of these back numbers, at least for preservation, and as I shall show hereafter, neither Providence, the State, nor the Society has yet provided a place for these volumes.

After conferring with Secretary Thompson, it was decided, because of his ill health, that I proceed in this matter immediately, even before I came into the position of Secretary, and to this end in the month of December last, letters were sent to every place in the State where there was the least promise of success in securing one or more volumes. During the next three months upwards of five hundred letters were dispatched on this errand, and to the credit of all those who had copies not in use, be it said that a generous response came from all directions, which necessitated frequent, even daily calls for a large part of the time, at express and freight offices. I was quite astonished at the success of the movement, but one item of experience was quite amusing and altogether a credit to our Society. My first venture was to the office of the Secretary of State, who had none to spare, but suggested there might be some volumes lying in the county clerk's offices, that had not been called for. I immediately dispatched letters to a large number of these offices, and received about the same reply from all but one to the effect that the volumes of the Michigan Pomological Society were always taken, but that of any other State documents sent out there were considerable supplies.

BACK VOLUMES ON HAND.

As a result of this collection, there came into my hands, during the year ending December 1st, six hundred and fifty-seven volumes of the years 1871, '72, '73, '74, and '75.

Through the kindness of the authorities at the Agricultural College, these volumes, except what have been sent away in exchange and to institutions, are on deposit in the basement of the college building. They are safe from neither mice nor mould, but no better place could be secured.

During the year I have sent away, at the request of other institutions and societies, and as exchanges, 9 volumes of 1871; 22 volumes of 1872; 18 volumes of 1873; 32 volumes of 1874; 121 volumes of 1875. This leaves in the possession of the Society 455 volumes of reports prior to 1876. The receipts and disbursements, together with the volumes on hand, can be seen at a glance in the following table:

	1871.	1872.	1873.	1874.	1875.
Receipts.....	12	119	88	96	342
Disbursements.....	9	22	18	32	121
Balance on hand.....	3	97	70	64	221

ROOM IN THE NEW CAPITOL.

In this connection it may be well to indicate the progress made in acquiring some place of depository for these volumes and other property in the hands of the Society. Some time during last year a committee was appointed to take measures, if possible, toward securing a room in the new capitol. This committee was continued by resolution at our meeting in Pontiac last February, and President Lyon, who is a member of that committee, was requested to present a memorial to the Legislature, asking that a position be given our Society in the new capitol. Subsequently it was decided that it should be sent to the Governor as one of the building commissioners, and in accordance with this decision the following memorial was prepared and forwarded by our President:

PRESIDENT'S OFFICE,)
 South Haven, March 8, 1877.)

To His Excellency CHARLES M. CROSWELL, Governor of the State of Michigan:

SIR,—The undersigned, on behalf of the Michigan State Pomological Society, would respectfully represent, that from the time of its organization this Society has felt itself embarrassed and limited in many of its operations from the lack of a place in which it can be recognized as having a local existence,—where its records can be kept, and where it may hold its official sessions, with perhaps occasional general meetings; also where it may be able to accumulate material for a library, and perhaps for a museum or collection of such botanical, horticultural, entomological or other scientific specimens as shall be found useful and valuable for the elucidation of the subjects that shall come within the scope of its operations. The Society is the more desirous to supply this lack, from the conviction that in carrying into effect the purposes herein suggested the general efficiency of its operations would be greatly increased, while at the same time stronger guaranties of the permanency of its organization would be afforded.

Under the influence of these considerations, the Society has instructed me to address to your Excellency, as chairman of the Board in charge of State buildings, a request that upon the completion of the new capitol a room or rooms therein be assigned for its occupancy, either alone or jointly with the State Agricultural Society (as shall be found most expedient or convenient) for the purposes indicated.

Under the conviction that the operations of the Society during its comparatively short existence have not been without beneficial influences upon the general interests of the State, and with grateful recollections of its fostering care over the interests of the Society, we trust that the request herein made may be adjudged to be a reasonable one, and that it may receive your earnest and favorable consideration. And your memorialists will ever pray.

T. T. LYON,
President Michigan State Pomological Society.

Governor Croswell and others in authority, I believe, gave assurances to President Lyon that all that could be done for us should be, and repeatedly the Governor has said to me that we should be remembered in some way. I give in full the following letter from the Governor in answer to a final inquiry from me regarding our prospects:

ADRIAN, Nov. 9th, 1877.

Charles W. Garfield, Esq., Grand Rapids, Michigan:

MY DEAR SIR—I have yours of the 2d inst. Room in the new capitol was assigned for the use of the State Board of Agriculture, together with the State Agricultural Society and the State Pomological Society jointly. It was recently suggested that these societies would probably have no use for this room, and that it be given up for other offices. I felt, however, that it should be preserved for such purpose, and that it would and could be used to advantage. I am glad that you manifest an interest in the matter. I suggested to the Secretary of the State Board of Agriculture that the room should be fitted up, and might be made very attractive with specimens of agricultural products, and sketches, designs, and models of implements of husbandry, also of improved farm-houses, barns and other appliances for carrying on the work of the husbandman. Agriculture is one of the most important, if not the most important interest in the State, and it certainly ought to be represented in the capitol in a prominent and desirable place.

Yours very truly,

CHARLES M. CROSWELL.

We should have a permanent location where we can deposit our nucleus of a library, and where we can preserve, in some quantity, the numbers of our own reports as they are issued from year to year.

OUR LIBRARY.

It will be seen from what I have already remarked that some of our back volumes collected have gone in exchange for reports of other States and societies, so that from almost nothing in this line we have grown to a library containing the following reports:

	VOLUMES.
Maine Board of Agriculture.....	13
Maine Horticultural Society.....	4
Massachusetts Board of Agriculture.....	1
Vermont Board of Agriculture.....	1
Connecticut Board of Agriculture.....	3
Wisconsin Agricultural Society.....	13
Wisconsin Horticultural Society.....	4
Illinois Board of Agriculture.....	6
Illinois Horticultural Society.....	9
Indiana Board of Agriculture.....	7
Indiana Horticultural Society.....	6
Ohio Board of Agriculture.....	15
Iowa Board of Agriculture.....	1
Iowa Horticultural Society.....	1
Ontario Fruit Growers' Association.....	3
Total gathered this year.....	87
Miscellaneous volumes from Secretary Thompson.....	26
Total library of the Society.....	113

This is not very large, to be sure, but is worth preserving, and if we had some

permanent, safe depository we should immediately acquire valuable additions by donations and exchange.

REPORT OF 1876.

It has been the custom for years to issue the Report of the State Board of Agriculture, and the report of our own transactions, so as to be ready for distribution at the State and local fairs the year following. In January last, upon consulting the law in the matter, and the members of our Executive Committee, it was determined to issue in future the volumes of the society as promptly as possible after the close of the year. This would necessitate making a small volume for 1876, inasmuch as the number preceding it contained the proceedings of the society up to the State Fair of 1876, and again it would necessitate the editing of two volumes in one year.

As soon, however, as the resolution was determined, I proceeded as rapidly with the volume as possible, first deciding upon a plan of the volume which would answer as a model for future volumes. This plan was submitted to men who were accustomed to the use of reports, and as revised was adopted as you see in the printed volume before you. The reason for settling upon some permanent arrangement is apparent to any one in the habit of searching these volumes for facts—it expedites matters to know about where in any volume a certain class of matter is to be found.

The volume was somewhat delayed on account of getting as complete a report of Michigan at the Centennial as possible, which was kindly compiled and placed at our disposal by Henry S. Clubb.

The Secretary's Portfolio which first found a place in the volume for 1875, was continued in the volume for 1876, with slightly enlarged scope, including the current thought upon horticultural topics for the year, as gleaned from letters, conversations, and newspaper articles.

THE MEETING AT PONTIAC.

At the annual meeting in Coldwater, an invitation was transmitted to the society from the Oakland County Agricultural Society to meet with that association in Pontiac, for the quarterly session in February. The invitation was accepted, and I found in Mr. C. K. Carpenter, of Orion, our Vice President for Oakland, a valuable worker in arousing interest and planning for an enthusiastic meeting.

Our reception at Pontiac was warm and encouraging. The show of fruit excelled anything of the kind in the history of the society at its winter meetings, and the programme of exercises contained many valuable essays and addresses.

Great credit is due Mr. Kimball of Pontiac, for the efficient and appropriate arrangements for the meeting, and to the people of Pontiac, we owe a debt of gratitude for aiding us in putting the work of our society before the people of Oakland county.

We have many warm friends in that county, and I trust ere long we can again meet with them and receive as well as impart information upon topics connected with our work.

THE JUNE MEETING.

While engaged in getting out the volume of '76, preparations were also necessary to be made for the summer meeting to be held in June, at South Haven,—in acceptance of an invitation from the South Haven Pomological Society.

The time was a good one for people from abroad to visit South Haven and see the strawberries and raspberries, and the promise of peaches; but it was a very busy time for the people at that place, for with the picking and shipping of berries and the thinning of peaches, there was very little time to listen to speeches or discussions. However, there was a fair attendance from abroad and a considerable delegation from the immediate vicinity. One feature of this meeting was altogether new, and was an admirable one, to wit: Questions for discussion were announced some weeks previous to the meeting, and certain persons selected to lead in the discussions. With a little preparation and an exact time for the topics to be brought up they were ably handled, and created a good deal of interest.

It is my own impression that in future this idea must be more largely developed, in so much that the discussions upon topics of the time shall be the leading feature of our quarterly meetings,—a broader field of experience is thus brought to bear upon important questions, and we get at valuable empirical knowledge from men who would never think of writing a paper or delivering an address. The exhibition of strawberries at this meeting was wonderfully fine,—rarely are so many valuable varieties shown together in such quantity, and of so fine samples.

Altogether the June meeting was very much of a success, and will rank in the history of the Society as one of the most instructive sessions ever convened.

THE STATE FAIR.

As early as the June meeting it was very evident that the apple crop of Michigan would be very limited, and the promise of our usual show of fine fruit at the State fair could not be made. From all quarters of the State came the same information, "No apples." This note was sounded so long and loud that the managers of the State exposition began to use it as an incentive to greater effort in the other departments. They said: "Let the fruit growers do the best they can and there will be a meager exhibit in Pomological Hall, so we must make up in the other divisions by increasing our exhibition." This probably was an excellent method well employed, for as a result every department of the exposition was filled as never before, and the fruit growers were also aroused to do their level best. By dint of a good deal of correspondence, newspaper work, and circulars sent out both by the Secretary and Superintendent Reynolds of Pomological Hall, our people came out with enough fruit to overflow the hall.

Our good friend, Manning of Paw Paw, who had charge of Farm Products, and was crowded to the wall with material, was very skeptical about our requiring all the room assigned us, found we overflowed into his hall; but, thanks to his courtesy, it was received with good feeling. His remark at the close of the fair was characteristic of him and truthful of our people: "You Pomological fellows, when stirred up, can beat the world if you have to resurrect fruit in order to do it."

There is just one point on which our fruit men fail to equal the exhibitors in other departments. They do not make their entries early enough to enable the officers in charge to predict how much room will be needed, and no definite plan of the exhibit can be carefully made before hand. If all the leading exhibitors would indicate a week before the Fair the number of plates they would require, the space could be so arranged in the Hall as to agree exactly with the arrangement of the premium list, and the exact position of every division could be determined in advance, and placards put in place.

The fruit exhibit of 1877 was well labeled in the main, so that any stranger could pick out the divisions, and in most instances, the classes, but the department of flowers, in order to be as well arranged, must come to the same plan of having the entries of each class together. The uniform testimony of fruit committees was that never was the work done so easily, and we can have the same thing said by the floral committees next season, if we only insist upon method. The exhibitors, many of them, have false ideas regarding this matter, and desire their entire exhibit be together, but in such an arrangement it is impossible for a committee to pick out the entries in each class and make the proper comparison, and as a consequence justice in such an arrangement cannot be done.

We are making rapid progress in the right direction, and soon all prejudice will be overcome, and education and justice will prevail over a desire to advertise.

As far as I know there is general good feeling over the result of the exposition. The flower men would like a larger proportion of the premiums, but on the other hand the nurserymen, who are really upon the same plane with the professional florists, exhibit their stock with only recommendations from committees as their premiums, and the aim of the Society is to give these people all an opportunity to exhibit the character of their productions to those who appreciate them, and give intelligence as to where to purchase what is needed.

DIPLOMA OF THE SOCIETY.

A number of awards were made by giving the diploma of the society. This is considered by the Executive Committee as the highest award that can be given, and is only employed as a premium upon the most worthy entries.

The new diploma, which will soon be issued, will be a valuable acquisition to any one from its intrinsic beauty. It is in the hands of the Calvert company of Detroit, and probably by this date is nearly complete.

REPORT OF 1877.

Since February last at intervals, I have been at work on the preparation of our Annual Report for 1877, and have been furnishing copy to the State Printer, so that at this date the volume is in print as far as the proceedings of this meeting, and it will be issued if there is no preventing circumstance, of which I have no knowledge, about February first, and will contain some valuable scientific and practical articles prepared expressly for it, aside from the regular proceedings of our meetings, the reports of local societies and Secretary's Portfolio.

DISTRIBUTION OF REPORT FOR 1876.

The volume for 1876, was as evenly distributed, according to the law, as I could manage it.

The boxes were sent mostly to our vice presidents and the officers of the State Agricultural Society, and there remains in our hands 1,200 volumes, yet to be distributed, 500 of which should be disbursed singly, as parties call for them, 300 should remain in our hands if we have any place to put them, and the remaining 400 will be sent out in boxes, when there are farther calls.

I think it is well to hold on to quite a proportion of volumes to be called for, then they will certainly go where they are most needed and will be appreciated. Our volumes are valuable, and we cannot afford to have them wasted. My own

conviction is that quite a proportion of our volumes should go abroad as exchanges, and to supply institutions, where they will represent the fruit interests of Michigan to our honor.

OUR VICE PRESIDENTS.

My action during the year has been based upon the belief that to be an officer of so enthusiastic, self-sacrificing, and well-working a society as the Michigan State Pomological Society, is an honor; and again I have acted upon the text that "the people have a mind to work." The vice presidents selected at our last annual meeting have as a rule responded promptly to my communications, and have taken the trouble to distribute our reports gladly. From a number of them, as you have already heard earlier in the meeting, we have received valuable reports, and I feel under a debt of gratitude to them all for having seconded every effort of mine to make the society useful and popular throughout the States.

DECEMBER MEETING.

The present meeting of the Society was called here at Grand Rapids at the invitation of the Grand River Valley Horticultural Society, and in preparation for our coming they have done everything we could ask. It has been years since our Society last met here, but the influence we left was a spark of sufficient magnitude to develop a goodly blaze through the formation of an excellent local organization, which shines with our own augmenting the general light which we are all striving to give to Pomology and Horticulture.

FINANCES.

In making a financial statement as Secretary I shall not encroach on the domain of the Treasurer, and will only give an account of the disbursements classified from January 1st to December 1st, 1877. Checks have been drawn for every bill made against the Society, and I know of no outstanding accounts, except some slight expenses by Mr. Adams, a bill of which has not as yet been rendered. One matter requires a slight amendment in our method of financial operations, and that is in connection with the presentation of bills against the Society made by its officers for expenses. It is desirable that at least once a quarter a financial statement be made to the Executive Committee, and this cannot be done with any exactness as to our condition unless all liabilities are reported in the shape of bills and audited promptly, so that the check-book will show at any date approximately the expenses of the Society up to that date.

CLASSIFIED STATEMENT OF DISBURSEMENTS.

Back Reports and Exchanges.....	\$29 01
Report of '76.....	27 80
Report of '77.....	31 45
Executive Committee.....	80 85
Salary of Secretary to Sept. 30.....	450 00
Secretary's office.....	28 91
President's office.....	13 70
Treasurer's office.....	31 35
State Fair.....	200 11
Premiums 1876.....	5 00
Other printing.....	11 25

Advertising (principally for 1876).....	\$15 82
Traveling expenses Secretary.....	16 40
Delegate to Western New York Horticultural Society.....	32 28

Summary of disbursements to December 1st.....	\$973 93
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FUTURE WORK OF THE SOCIETY.

The work of the past year has in many ways been eminently satisfactory, but we are not in the proper condition unless we can see some things to mend—unless we are willing and glad to adopt new measures to increase our usefulness.

In glancing over the field in which we are to exert our influence and carry on our work, there are several amendments and additions that occur to me, would be advisable to incorporate into our method and which I am bold to suggest.

1. There needs to be a greater degree of intimacy established between the society and the various portions of the State, in so much that a continuous interchange of thought may be established. Questions of methods of management in all the departments of horticulture should be sent in from all quarters freely and brought before our meetings, that each section of the State may derive the full benefit of the rich experience of our members scattered over the entire Peninsula. The Secretary can be the medium of such correspondence, and when questions come to him for immediate answer he need not wait to bring them before a quarterly meeting but refer them immediately to members of the society, whose special work or experience has been in the direction indicated by the query, and I think from my experience in corresponding with the pomologists of Michigan the past year, they will be happy to answer fully any such questions referred to them. We are organized for the accomplishment of just this kind of work, and I submit this suggestion as indicating a method of carrying on one branch of our work.

2. It is necessary that some arrangement should be made somewhere by which we can secure a headquarters,—a place where our smaller meetings can be held, —where special committees can convene and feel that they are at home and encroaching upon no one,—and we need a place to gather our property and feel that it is permanently situated. If the great commonwealth of Michigan can not afford us,—as representatives of a leading interest in our State,—a single room in its capitol, or even if it is given grudgingly, it would be a question worthy of some discussion: What higher, nobler, or more worthy objects are the rooms in our capacious State building to be devoted to? and if there are abundant and satisfactory reasons for shutting us out, we must seek a corner somewhere else in the State.

3. I would further suggest that we do more newspaper work. When any important paper or letter is written upon a topic of the day that loses its force by waiting until the Report is published, some means should be taken to send the communication abroad through the State, and this can be done at a very little expense by sending printed slips to the leading State and county newspapers. These slips can be struck off for the cost of the press work, which is almost nothing, and for a penny each can be forwarded to fifty newspapers in the State, always discriminating as regards localities from the character of the communication. In this way our best work will reach every part of the State just when it is most needed.

4. We need to look upon our annual fairs more as sources of education to the people, and by every means possible strive to secure the same interesting

and attractive exhibition, while by skillful management the actual good resulting is increased very largely.

5. A strong effort should be made to largely increase our permanent fund. It is now decided by the Society that this fund shall be safely placed where it will continually earn something for the Society, and there are 500 men in Michigan that have sufficient interest in our work to pay ten dollars each into our life fund and take life membership certificates, if the matter were only placed right before them, and the method to be pursued is a problem worthy of immediate thought in its solution.

6. Our annual membership has of late fallen off, and although I believe this to be no sign of disintegration, still, if our work is continuously good, it should receive continuous support, and the men who give us their dollar one year have the same reason for making a similar deposit the next; and if this money is invested in our Society we get the interested assistance of the investor to see that it develops something, and this interested assistance is what we most need.

7. We need to make more use of our Agricultural College. To be sure, we are receiving from several professors valuable services every year, but, inasmuch as we have no experimental gardens and orchards, would it not be wise to employ, in some measure, the College gardens and orchards for this purpose? I do not mean by this to in any degree assume control of anything there or dictate as to its management, because this would be outside of our domain; but we have already been offered the opportunity of suggesting experiments to be tried there, and we have not lived up to our opportunities. My own thought is, that we should help by furnishing work to be done there in the line of experiment to build up a department of horticulture that shall be a matter of pride to us as well as to the College. We are invited to do this, and it is a great deal better for us to make valuable suggestions than to find fault. I can see that the most valuable kind of work can be done by linking together the work of our Society and that which may be done at the College in our line, and am in favor of seizing the opportunity.

And in closing may I be allowed to remark that I have faith in our Society, in its available working force, and in its ability to do generous service to the horticultural interests of the State for an indefinite period, and, with discreet management and interested assistance from those to whom it gives the most, the lines that limit its usefulness may be made to continuously diverge.

Henry G. Reynolds, Superintendent of Pomological Hall at the State Fair, next gave a report of his work at the annual exposition:

REPORT OF SUPERINTENDENT REYNOLDS.

To the President, Executive Committee, and Members of the State Pomological Society:

GENTLEMEN,—Our printed programme is so full of important subjects that I will make my report as short as may be. As regards special exhibits I will say nothing, as the reports of Mr. Chilson and Mr. Guild will doubtless cover these subjects.

The display, as a whole, was most unprecedentedly and unexpectedly large—indeed, much too large for the space allotted to us—and except for the restriction limiting town and county exhibits of apples to twenty plates each, we should have been entirely unable to have found space for the fruit offered. This restriction excited a good deal of unfavorable comment from those wishing to make an imposing display, but I think that further consideration will

persuade them that the regulation is a wise one. Our object is, not to compete with the fruit dealer in quantity, but to exhibit and encourage the highest development of the best article. The uniform testimony of every successful orchardist is that they first planted too many varieties for profit, and that the number of varieties which it pays to include in a market orchard is, in any given locality, very small. It is the province of our society to discourage the planting of the less profitable sorts and in this way to encourage the substitution of the better kinds.

It is true, we wish to see in our exhibitions specimens of as many varieties of fruit as possible, that we may learn to know and distinguish one from the other; but the proper place for this display is in the competition of single plates, where specimens of the same thing grown under varying circumstances and from various localities may be seen and compared; but I think that the principle should be established that when the Society grants a premium upon a collection, whether from county, town, or individual, or of whatever fruit, it should embrace only such varieties as the society can endorse as of the very first rank for profitable and worthy culture. An incidental and secondary advantage of this would be a great improvement in the appearance of our exhibitions, as admitting of uniform and classified arrangement.

I think all will agree with me in this who remember the neat and handsome appearance of the seventeen competing town and county collections of apples at the late fair. This would have been still further enhanced had we been able to put over each collection the name of the town or county from which it came, but this could only have been done by knowing in advance what labels to prepare, whereas for most of the collections there was no announcement previous to the first day of the fair. Would it be impracticable to require intending exhibitors to make their intentions known and to specify the space needed in each class a week or two in advance of the fair?

If this were possible it would be very desirable, as it would enable those in charge to prepare perfectly for all that was to come, so that there should be no crowding, no confusion, no disappointment.

It would be especially desirable in arranging the space for the competition of plates, as by this means the labels could all be placed in advance exactly right and with no waste of room, so that as each article arrived and was opened it could be put at once in its right place and need no subsequent moving or re-arranging. In this connection I wish to speak of the value and importance of a plain and complete series of labels. Those provided last September we owe to the forethought of our Secretary, and I hope that another season will see the same system carried through every class, and even to every plate. In this way only does our display become intelligible to the general public. Without it we speak in an unknown tongue and therefore not to edification.

Another matter to which I would call attention is the prime necessity of a good light for our displays. At the late fair its absence was very much felt, as the building assigned to us could hardly have been less suited to its purpose, and the kind offices of the Agricultural Society in decorating the hall for us in advance proved hardly an advantage as the heavy green boughs, though very beautiful in themselves, absorbed a great deal of what scanty light there was. For a hall built of rough timbers, a better plan, I think, though a somewhat expensive one, would be to hang walls and ceiling with cheap white cotton, or other white goods if cheaper, upon which the lightest possible design in sprays

of evergreens would be a tasteful and all sufficient ornamentation, and thus our light would be husbanded instead of squandered.

The first cost of material thus to kalsomine our exhibition hall would be considerable, but when once bought the same stuff would avail for several years; and even this cost might be materially lessened if we could secure shopworn or otherwise slightly damaged goods, which in such large quantity could be had at very low prices.

Another expedient which I put in practice, to remedy in part the defective light was simply to cover the entire shelf surface devoted to fruit and flowers with white printing paper, securing it in place by means of strips of wood about a quarter of an inch square and tacked exactly in the manner of a stair carpet rod along the inner angle of each step in the shelves.

The advantages of this arrangement are the ease of application, the neat and uniform appearance of the shelves, and a white background, which is the best possible one for showing to advantage the delicate colors with which we have to deal, and makes the most of all the light we have.

There are some matters which were brought forcibly before me during the fair, but which, as they may hardly be considered within the scope of such a report as the present, and more especially as they are each deserving of separate discussion at length, I will do no more than to suggest.

The first of these is the matter of our premium list, which, as at present constituted, seems to me designed to secure to every exhibitor some little crumb of comfort, rather than with the object of stimulating a sharp competition in the production of an extra article—something a little better than anything heretofore known. For this latter purpose we need to have very much fewer premiums, and these few so large as to excite wide-spread efforts to secure them.

Along with this change would need to be the substitution, from our present hap-hazard system of awarding committees, of paid judges, experts in their several departments, who are chosen in advance by careful consultation of the Executive Committee. Our subjects are all so closely allied that we would really need but three such judges (aside from the Orchard Committee), one for the plants and flowers, one for fresh fruit, and one for all varieties of preserved fruits.

If our display were properly classified and arranged to facilitate the work of these judges they would be able to do the whole. The plan of having three members to every awarding committee is solely designed to divide and spread the responsibility, which is exactly what we do not want.

A much better way of lightening the odium of unpleasant decisions would be to protect our judges and instruct our members with a well digested scale of points under every premium offered. Our orchard committee have before this found the necessity of such a scale, not only for their own justification, but for their guidance; and I am fully persuaded that it would be found equally useful in almost every class.

Another point requiring attention in our premium list is the necessity of greater definiteness and precision in the statement of all conditions affecting the different compositions. Several unpleasant differences of opinion arose, and some of our committees were subjected to undeserved criticism because of such incomplete statement. The premium list is almost the only explanation which is read by the majority of our exhibitors, and it should leave nothing to be understood or taken for granted, as whatever is so left will be pretty sure of being misunderstood by a great many.

And finally, as a last point, I wish to urge the abolition of my office. It is an old saying that what is everybody's business is nobody's business, and our society is in some danger of realizing this truth under its present system of managing the annual exhibitions. We have one too many officials. The general Superintendent of Pomological Hall has no duties which do not properly and fairly belong respectively to the Superintendents of Fruits and Flowers, or else to the President, Secretary or Executive Committee. Happily, the evil system has thus far borne no perceptible fruit of its kind, but the merit of this fact belongs, I think, rather to the humanizing and improving influence of our profession than to the system itself. Let us look a little at what may be considered the superintendent's sphere.

As the first preliminary to the fair is the work of stirring up the exhibitors and receiving and answering communications from them. Surely the former is most effectively done by the one who can say to those whom he invites that whatever is shown will be under his own immediate supervision; and the latter is best understood at large by the simple rule, "All communications should be addressed to the Secretary." Then, if department superintendents wish to know the probable extent or character of the show in their department, the Secretary will have the latest data. Just before the fair comes the needed preparation of the hall; and here is one place where one man could do as well as more; but it would be no onerous task to make it devolvent upon any one of the otherwise much needed officers to attend to this one matter. For instance, request the Superintendent of Fruit to make it his business to see that the hall is in readiness, or even appoint in advance a resident member of the society as a committee of one to attend to it. The relative space occupied by the different departments could be decided as well by department superintendents in conference, and, if desired, with advice of President, as at present; and the subdivision of the space of each department to the respective exhibitors certainly belongs to the superintendent of that department, and not at all to a general superintendent.

Then, the "Courtesy of the House," the distribution of the meal and entrance tickets to exhibitors, committees, and officers, would certainly be as appropriately placed, primarily, in the hands of the Secretary or President, who should supply the various officers and among others the superintendents, and secondarily with these superintendents who should distribute to those entitled to them in their departments.

And lastly, a General Superintendent's report in addition to reports of Secretary and department superintendents is a nuisance requiring abatement. The ground to be gone over is the same. The only thing which the department superintendents do not report upon,—their own merits,—though for this year a most prolific theme, is the proper work of the Secretary or President, and thus as you see there is nothing left of the office which I have tried to fill—but the name.

Very respectfully,

HENRY G. REYNOLDS.

E. F. Guild of East Saginaw, who had charge of the Floral Exhibit at the State Fair, made the following report of

PLANTS AND FLOWERS AT THE ANNUAL FAIR.

To the Executive Committee and members of the Michigan State Pomological Society:

GENTLEMEN—In looking over the place and space allotted to plants and flowers at the State Fair, I think it is a great credit to those who exhibited that so good a showing was made. I must say that it is really creditable to the good people of Jackson and vicinity, that the hall was so well filled with that which is pleasing only to the eye, with that which most farmers say is labor thrown away to raise such stuff; but we are glad the time is fast approaching when people are learning to appreciate such things more, to spend more time in making their homes attractive, and pleasing to the eye. To W. R. Hibbard of Jackson, and C. Van Haaften of Kalamazoo, belongs the credit of making the larger portion of the professional display in plants, which were quite extensive, finely grown and extremely creditable displays, reflecting much credit upon the exhibitions.

Mr. E. Cooley, of "Wildwood," Jackson, made a fine exhibition of hothouse plants and flowers in a glass case, the arrangement and character of which reflects great credit upon the establishment from which they came.

In the amateur list, Mrs. W. K. Gibson, Mrs. Dr. Andrews, and Miss D. L. Field, were the principal exhibitors, and to each a large amount of credit should be given for the amount of labor they bestowed in beautifying the central portion of the hall. Mrs. Dr. Andrews fitted up a little sanctum, or more properly arbor, by deftly combining and arranging form and color, with the treasures of her greenhouse and garden, in such a manner as to call forth the encomiums of the passing crowds, which certainly were well bestowed. Single specimens were exhibited by several parties among which were some very fine specimens that were well grown, and among which the competition was so sharp that the committee were unable to decide.

The display of bedding plants, and cut flowers, was fair as to quantity, and in quality usually good, but some allowance should be made as most of the exhibitors resided outside of the city and some quite a distance from Jackson. Among the exhibitors from the city of Jackson, especial mention should be made of and much praise is due to Miss Nellie C. Jenkins, for the energy and perseverance displayed in arranging her flowers (saying nothing of the growing them), she being a teacher in the public schools was obliged to perform her duties in school, and arrange her flowers at such times as could be spared from her other duties at school and at home, her mother being dependent for support upon the labor of the daughter. The arrangement of cut flowers and designs were all very tasteful and unique in form, colors, and originality of design. All the classes were well filled, and for beauty of arrangement and ingenuity of design much credit is due to the fair hands, who with such delicacy could weave in fancy and bring into form such delightful objects as were found in this department. Several entries were made which did not get premiums, but which were worthy of special mention or recommendation.

For Vick's Special Premiums on cut Flowers there were five entries, and all well grown, creditable, and nicely arranged displays. The competition was very close, and when the committee finished their duties and made known the awards, a protest was entered by Mrs. R. M. Cook, of Charlotte, who was awarded the second premium, but the second committee, which had served on

the professional list of pot plants, unanimously confirmed the decision of the first committee, which had a tendency to show that the decision of the committee was wise and just. The work of the committees was very arduous, but by patience and perseverance were overcome, especially was this the case with the committee on professional list of pot plants on account of being obliged to put Mr. Van Haften's collection in Fine Art Hall from deficiency of room in Pomological Hall, a feature which should be remedied hereafter if possible, as it makes the duties of the committee more laborious and more difficult to make proper awards than when comparisons can be made together.

I cannot close this report without tendering sincere thanks to the several committees, and to George Taylor of Kalamazoo, Wm. Rowe of Grand Rapids, Mrs. Austin Blair, Mrs. A. J. Gould, Mrs. C. E. Tunnickliff, Mrs. W. H. Withington, Mrs. A. A. Bliss, Mrs. Dr. Nims, and Miss Ella Fletcher, all of Jackson, and Miss Ida Chilson of Battle Creek, Mrs. S. Blanchard of Tecumseh, and Mrs. Thayer of Lansing, who served on the several committees. The Society cannot but be very grateful for the efficient manner that the work was done and the general satisfaction that the different awards gave to the exhibitors. I would tender my thanks to Supt. Reynolds and Secretary Garfield and wife for the assistance, kindness, and courtesies extended during the exhibition. And to my assistant, Miss Adams, I would tender my thanks for the able assistance and strict attention which she gave to the duties assigned her. Her ever smiling countenance was like rays of sunshine in the hall, and to her enduring patience and perseverance may be attributed the general good feeling engendered between the exhibitors and officers of the society.

Very respectfully submitted by your obedient servant,

E. F. GUILD,

Superintendent Floral Hall.

East Saginaw, Nov. 22, 1877.

ELECTION OF OFFICERS FOR 1878.

The hour having arrived set apart for the purpose, the Society proceeded to the election of officers for 1878, which resulted as follows:

President—T. T. Lyon, South Haven.

Secretary—Chas. W. Garfield, Grand Rapids.

Treasurer—Samuel L. Fuller, Grand Rapids.

Members of Executive Committee for three years—W. K. Gibson, Jackson; E. F. Guild, East Saginaw.

Vice Presidents—one for each fruit county, as follows: Monroe county, I. E. Ilgenfritz; Lenawee county, S. B. Mann, Hillsdale, F. M. Holloway, Branch, J. D. W. Fisk, St. Joseph, Chas. W. Sheldon; Cass, B. G. Buell; Berrien, A. O. Winchester; Van Buren, A. G. Gulley; Kalamazoo, J. N. Stearns; Calhoun, J. A. Robinson; Jackson, H. F. Thomas; Washtenaw, J. Austin Scott; Wayne, J. C. Holmes; Macomb, J. E. Day; Oakland, C. K. Carpenter; Livingston, Lewis Scott; Ingham, Asa W. Rowe; Eaton, Mrs. R. M. Cook; Barry, A. C. Town; Allegan, M. B. Williams; Ottawa, O. R. L. Crozier; Kent, Wm. Rowe; Ionia, Jay D. Stannard; Clinton, S. S. Walker; Shiawassee, J. P. Barnes; Genesee, N. A. Beecher; Lapeer, Mrs. R. G. Hart; Saginaw, Wm. L. Webber; Gratiot, Wm. O. Fritz; Montcalm, James Satterlee; Newaygo, Sullivan Armstrong; Muskegon, S. B. Peck; Oceana, E. J. Shirts;

Mason, F. J. Dowland: Manistee, S. W. Fowler: Grand Traverse, W. W. Tracy.

At a later date in the meeting, Mr. S. L. Fuller appeared and announced it was impossible for him to serve as Treasurer of the society. He said that he was willing and glad to do all he could for the society, but as he looked upon the duties of Treasurer there was a good deal of work to do, and he could not spare the time and attention that it would require to make a successful officer.

A ballot was again taken for Treasurer which resulted in the unanimous election of S. M. Pearsall, of Grand Rapids.

The closing exercises of the afternoon was a paper entitled

HOME ORCHARDS VERSUS MARKET ORCHARDS.

BY T. T. LYON.

There is probably at the present time no more noticeable tendency among the planters of fruit trees than that of the limiting or reducing of the number of varieties to be planted. This tendency is doubtless to be attributed, primarily at least, if not mainly, to the experiences and influence of planters and growers for market, and inasmuch as the supplying of markets is by no means the only object for which planting is to be done, if, indeed, it is even the more important one, it behooves us to consider well the different purposes to be subserved and the mode and modes by which the society can most wisely and effectively lead in the direction best calculated to advance the highest interest of all concerned. The market idea has, of course, mainly to do with the question with what varieties of fruits and under what system of management can the plantation be made to yield the largest and most permanent net income. If a market is to be supplied throughout the season, a greater number of sorts will, of course, be required than if the crop is to be put upon the market in a single lot or at wholesale, but in neither case will the selection of varieties to be planted have the slightest reference to quality or appearance, except so far as the same may be expected to increase the amount or the certainty of such net returns. Indeed, so steadily has this idea been adhered to by many commercial planters, of apples more especially, that in regions in which commercial fruit growing has come to be the leading interest, extensive orchards may be found in which at almost any time during the fruit season it would be difficult for a discriminating lover of fresh fruits to find a specimen that his taste would not reject as uneatable, unless, indeed, his appetite has been sharpened by continued abstinence. Indeed, so generally is the apple especially unknown in its finer dessert varieties among our people at large, that it seems to have come to be largely ranked with culinary vegetables, and as a rule is little used uncooked in very many families, in which the idea of placing it as a dessert before the family or visiting friends is rarely if ever entertained.

With the wisdom or propriety of selections for planting upon the principle before indicated, we are not disposed to take issue, so long as the commercial result is the point aimed at, for the reason that the great mass of buyers, especially in our cities and larger villages, seem content to select their purchases with more regard to appearance than quality, while the education of such markets to a higher appreciation of quality, is, by most persons, regarded as a hopeless task. We are, however, by no means to be regarded as conceding this point; and, indeed, we might adduce many and authentic proofs of the higher

profitableness of the opposite practice, but it is not our present purpose to consider the question, and we therefore, proceed upon the assumption that the present preferences of our leading markets are to be consulted in the planting of commercial orchards. In taking leave, for the present, of this particular branch of our subject, we may indulge the suggestion that the commercial fruit interest, being so peculiarly amenable to the money question, and withal one of so direct and simple a character when separately considered may, for these reasons, be held to call less imperatively for the fostering and educating influences of this society, since the man who will venture blindly and ignorantly upon the planting of fruits for commercial purposes, may, as a rule, be set down as hopelessly beyond the reach of its influences.

HOME ORCHARDS.

The broadest field, and one which seems most imperatively to call for the missionary labors of the society, is the one occupied by those who plant mainly for local or home consumption, with a possible surplus, in some cases, for the market, such as the amateurs of fruit, the planters of city and village gardens, and the more extensive class who plant and manage farm orchards, comprising our farmers, mechanics, day laborers, professional and business men to whom fruit culture is but an incidental matter, and whose minds are as a rule too fully absorbed in their leading pursuits to leave opportunity or disposition for such study of the subject as may be necessary to enable them to wisely adapt their selections for planting to the purposes for which they may plant.

In consideration of the immense mass of mere rubbish which goes to the making up of our standard works upon fruits as well as the catalogues of many of our nurseries, the needs of this class of planters demand the benefits of a wide experience to enable them to select judiciously from the sources above named, if indeed they do not, instead of consulting them, follow the dictum of some enterprising "tree peddler" with his own objects to subserve and his own plants to be disposed of, while on another hand so great is the variability of varieties under modifying climatic or other influences that no such consultations can be safely relied on except when taken in connection with the deductions of local experience.

Besides the selections for those purposes should unquestionably be made with but a secondary reference to the points so indispensable to the profitableness of a mere market plantation; the first or leading consideration being quality, including delicacy of flavor and texture, which, for home use, may and should take precedence of beauty of specimens, ability to bear rough treatment, and even to some extent of production. Indeed, to the great majority of these classes of planters so very serious is this difficulty that we may be excused for iteration in part by remarking that even in our standard fruit books the descriptions, often very crude and imperfect, will be found to be so buried beneath an immense mass of descriptions of indifferent or worthless sorts as to render a wise selection, aside from local knowledge or experience, a practical impossibility. Still, underneath this mass of rubbish lie hidden the results of hundreds of years of experience and progress in the field of pomology, including many of its choicest gems, some of which for ages have been recognized as distinctive way marks of progress. We have, therefore, no alternative but to subject this mass to the winnowing and sifting process, retaining the grain and driving away the chaff, or otherwise to ignore the labors of the past and trust the tastes and selections of our people to be formed upon the narrow, and

for this purpose unworthy commercial basis heretofore considered, an alternative which we trust no devotee of pomology and no one ambitious of the credit and usefulness of our society, will for a moment consider.

Indeed, if we have not utterly misunderstood the mission which this society has assumed, it is to elevate rather than lower the standard of pomological, we wish we might say horticultural, tastes, till instead of gloria mundi, striped bellflower, red and green and pumpkin sweetings, not our orchards and gardens only, but our fruit exhibitions as well, shall annually put in the front rank the more delicious and worthy, though smaller sorts, that commend themselves to the palate more than to the eye, when tasted begetting the desire to taste again. We could certainly not forget that when a surplus shall be produced it should, as far as practicable, be capable of answering the commercial demand, but we would by no means forget the grower, if any one can afford to produce for himself, family and friends the very best, and that to enable him so to do, so far as fruits are concerned, it becomes peculiarly needful that he be informed what to plant for the purpose, as well as what peculiarities of management may be necessary to the highest success therewith.

WRONG EDUCATION.

If such be the mission of the Society, it may be well worth its while to consider whether by encouraging, as it seems tacitly to do, the exhibition at its fairs of large and showy, but worthless fruits, such, for instance, as those previously mentioned, it is not in effect educating a large class of planters in a wrong direction. Whether we might not, for instance, as well offer leading premiums for bouquets of the finest and largest sunflowers as to permit committees, as is often done at our fairs, to place premium cards upon collections of fruits in which such very showy but utterly worthless sorts figure conspicuously. Indeed, the advantage would seem to be with the sunflower, inasmuch as their exhibition could hardly mislead the lookers on, while in the case of fruits the fact is notorious that many visitors seeing premiums apparently, if not really, awarded to these worthless sets of fruits, are thereby induced to introduce them into their own plantations.

FAULTY PREMIUM LISTS.

We may also be permitted to suggest the query whether our premium list of the past year may not be faulty in the following particulars: Whether the number of varieties of apples (20) is not too great for a market orchard without succession, and too small where a succession throughout the season is required; also, whether the society should not in its premium lists in some manner indicate its views as to the number and the relative value of varieties requisite to a farm, or a family orchard, including also lists of the other fruits which more or less commonly constitute a portion of plantations for this purpose, at the same time, by means of the collections shown and the awards of the committee, drawing out some indications of the views and preferences of exhibitors and of committees. In this respect the society has, during the past year, taken a new departure by the adoption of a plan for the preparation and gradual perfecting of a catalogue of the fruits deemed worthy to be recommended for cultivation in this State, and proposing in such catalogue, to supply such information as shall enable the planter to select for the desired object by means of the characteristics of the varieties, and their valuable or objectionable qualities as therein set forth, and inasmuch as there is, and of necessity must

continue to be, a very wide diversity of wants among the numerous classes of planters, whether for farm or family purpose, with or without a surplus for sale, for city or village gardens, for village or country markets, with or without succession, and for commercial orchards, with or without succession, with the added consideration that we must farther recognize the varying wants of the different localities as well as the peculiar demands of different tastes even in the same family or locality, and especially when we reflect that such a catalogue must necessarily become the indication by means of which, to a greater or less extent, the success of varieties in our State, and, as a consequence, the capacity of the State for fruit culture will come to be estimated abroad; whether we should next act upon the condition that while the fullest prominence should be given in such catalogue to market varieties of fruits as such, and while it must be held to be of the utmost importance that these market sorts be so fully and perfectly characterized as such that they shall stand forth in such catalogue as a distinctive class with the relative qualities and comparative values of such carefully and accurately defined, this same catalogue should, on the other hand, become a magazine of information in which the various classes of other planters, for whatever purpose, may search not merely for information what to plant, and that whether their needs shall cover a broad or a narrow field, but where, to some extent, they may learn what not to plant, so far at least, as a very considerable class of common, but undesirable varieties, may be concerned.

VALUE OF A GOOD CATALOGUE.

It may possibly be said that to place such varieties in such catalogue is at least to some extent to encourage the planting of them, but to those who have studied the proposed plan it will only be needful to say that the mere insertion of the name of a fruit in such a catalogue, while its value shall be placed at or near zero, can hardly be said to be an encouragement to plant it, while those who, from having seen such variety in unexceptionably favorable circumstances, may have formed too high an estimate of its value, will thus become warned to look farther before proceeding to plant it. Such would at least be the result, if proper use be made of the proposed column for marginal notes. A similar result might, however, be secured by the introduction of varieties of the character indicated in a subsidiary or appended list similarly arranged and in which the family peculiarities of this class of varieties might receive more especial prominence than would be deemed admissible in the catalogue proper.

THE OUTLOOK.

I might, in conclusion, remind the Society that the field in which it is laboring is a very broad one, and that with each advancing step new vistas of labor and usefulness are sure to invite its efforts, that in fact we are not to expect to find a legitimate end, or even a pause in our career of labor, while we can look back with eminent satisfaction upon the less than a decade of the Society's existence and felicitate ourselves with the consideration of the much we have already accomplished. We may yet very properly remark, as did Newton, when nearing the close of that life that had wrought out so much for science and humanity, "I seem to have been pleasing myself in gathering a few of the more beautiful pebbles along the shore, while the boundless ocean lay all undiscovered before me."

Wednesday Evening Session.

The first exercise of the evening was the reading of a paper upon

FARM ADORNMENT,

BY MRS. M. P. A. CROZIER.

Probably one of the things least thought of by farmers in laying out and cultivating a farm is its effect upon the landscape, its value as a rural picture. Yet just here a little forethought and taste would often be exceedingly valuable. With little extra cost, perhaps, and with equal convenience for business, the grounds around the house, the fields, the orchards, and the woodland might be so arranged as to be much more satisfying to the lover of natural beauty. A little art greatly assists nature in her efforts to please us. I can touch but lightly on this general phase of the subject, where so much might well be said. It is very easy to destroy—it is not so easy to build up. To grow a tree is the work of time. If it is already done for us, let us be considerate in regard to cutting it down. "Woodman, spare that tree," when it will do to spare it, for it is His hand, the Father's that "hath reared these venerable columns," and crowned them with the "verdant roof." It is true that in our beech and maple lands we must depend mostly on young trees for our door-yards; on oak lands this is not so necessary. The æsthetic sense has rights; let us not ruthlessly trample them in the dust. Beauty has uses of her own not to be forgotten in the account of profit and loss. If the value of beauty could be told them in dollars and cents, how many farmers might stand aghast at the amount of the fortune which they have neglected to save.

"No time for such things," and "no money to spare on them," are perhaps the two greatest bugbears that prevent the prosaic farmer from making his bare, bleak farm that "thing of beauty" which it is capable, with only a little effort, of being made and becoming "a joy forever" to his family. That he "has all the time there is" makes no difference with him. He finds time to get a living, time to acquire and run over many more acres than he can cultivate well, time to make money to lay up for his children, time to attend to politics. Though of a frugal class, he has money to expend for rich food, for tea, coffee, and tobacco; these are necessities of life to him. If he felt, as perhaps his toiling wife feels, the necessity of beauty in his surroundings, he would find a little money for that also, although it might be in the denial of grosser appetites. I doubt not many a poor woman would willingly live for a week upon corn bread and cold water for the gift of a climbing rose at her doorway, or go without butter for a fortnight for a bed of glorious verbenas before her window, all the long bright summer. If you ask the use, O thoughtless farmer, of attention to this matter, there is this use: it may refine your rough nature, it will certainly make your wife and children happy. Has this happiness no value in your household? Does it matter nothing to you whether home is bright with glad eyes, and merry with cheerful hearts? I think there is in the heart of almost every woman a strong love of beauty. The manner of its expression is controlled by circumstances. Properly cultivated and given opportunity, it often finds expression in both the external and internal appointments of a beautiful home, and a quiet but charming arrangement of personal attire.

Distorted, it develops into extravagance of apparel, and is only satisfied with public display. I think nearly every child upward of a few months old possesses this love of beautiful things. Is it worth while to encourage its growth, or shall it be repressed and the animal in his nature be allowed to gain ascendancy over the spiritual? It needs no instruction to make a child of four years love a flower: it will need very little to teach him which is the corolla, which the calyx, which the stamens and pistils, and the use of each. This is cultivation. He has then a new interest in the blossom. I plead that for woman's sake, and for the children's sake, there be pleasant grounds around the farmer's homestead. She needs it as a relief from a round of exhausting toil, they as a means of culture, as a help to their mental and moral growth. It is a matter of consequence whether, in her round of work, the farmer's wife looks out upon a scene of beauty, or upon the general debris of the farm. Do you say that woman should be cheerful in doing her duty whatever her surroundings? Granted, but love is a sweeter word than duty, and love is an outgrowth of circumstances. Will your wife and children love you as well if you provide nothing to make their home pleasant? Granted that woman should be happy in doing her duty,—“Rejoice evermore” is authoritative. But does God give this precept and not at the same time provide means which make obedience possible? He has done his part in surrounding us with elements of happiness. He sends the angel of change to bring out the spring flowers, to clothe the forests with greenness, to glorify them in autumn, and to drop upon them in winter those soft snow fleeces that make the landscape in the golden morning seem like a symbol of resurrected life. Indeed God has done his part to make men happy! This shows how he regards happiness; and the farmer's wife may well claim a liberal share of enjoyment of natural beauty. With all her cares she will get none too much, if her husband is considerate in this matter.

It is not really so much a lack of time, and money, as of their proper apportionment to meet the varied wants of human life, that prevents a greater attention to farm adornment. There is too much forgetfulness of the aesthetic nature. A man remembers that his sturdy boys need boots; they will hardly allow him to forget this, as the winter nears with its pinching cold; but does he realize that the demands of the soul are quite as urgent as those of the body, none the less so because less clamorous? It is pinched, starved, for lack of that which an hour's thoughtful work could readily give.

But if the farmer really finds he has not time to beautify his farm, let him give the boys and girls a chance. They may not be adepts in landscape gardening, but it requires little labor to teach a boy of a dozen years how properly to set a tree. Show him how once or twice and just let him learn the first verse of Bryant's “Planting of the Apple Tree,” and see if after that he does not succeed as well as you; only it might be well, lest he take poetry too literally, to suggest that mellow plowed ground is better than “green sward” to plant apple trees in, that it is possible too much tenderness in pressing the soil about the roots may endanger loss from drought. Encourage this work by the gift of an occasional quarter to buy something new, and see if your desert farm does not soon “blossom as a rose.” The arrangement may not exactly suit a critical eye, but the verdure and the bloom will be pleasing for all that, and a rich means of culture. I shall not too persistently urge a closely clipped lawn at all times,—I know about planting corn, haying and harvest, and potato digging. But I will urge this, that the house have grounds of its own, sacred to the uses of beauty, that it be situated away from the road dust and the stable yards,

that it have around it plenty of grass of some kind, trees, shrubbery, and some flowers. Not that trees should be too close around the house; I know one with a grove of maples closely crowding it, on nearly three full sides, and almost all the sunshine that can enter the dwelling must come in in the morning. I think the house must be damp, and I know, whether this be the cause or not, that the farmer's wife is never well. I know a dooryard, which, within about a dozen years, has grown to be a source of much pleasure, from the native trees, transplanted mostly by one boy. I wish that I could make you understand a tithe of all its varied beauty! There is one soft maple not far from the front of the house, which is almost always lovely. Even the bared branches have a delicate tracery against the sky, that is pleasing. Then when spring brings out its crimson flowers, when, later, it stands in summer dress, and still more when autumn "lays its fiery finger" upon it and it glows, possibly for weeks together, like a burning sunset before the window, it is a treasure whose value can never be told: and it has cost so little! There are elms with their long green plumes, a tulip tree that gives promise of a wealth of blossoms by and by, poplars with varied and interesting foliage, the sumach, like a huge bouquet when in bloom, the linden,—but I forbear, and only mention a little hemlock, slow in growth, but so exquisite when the new foliage is putting out.

It is well in planting trees, to think of autumn touches: Persistency of green foliage is desirable in some, and for this are most fruit trees valuable. As a back ground for the bright colors of the hard maple they can scarcely be excelled, except by evergreens. I think I never saw a more beautiful autumn dress, than that worn by a strip of woods I passed a few days since, where deciduous and evergreen trees were intermingled. The poplars too are valuable for retaining greenness late. Here the first of November are these trees still green, while elms, black-walnuts and others are nearly or quite bare. For holding foliage late, and for gorgeousness of fall attire, remember, too, the common beech.

If not prejudiced by the idea that town people have more time for the ornamentation of their homes, farmers might learn something to their advantage by close observation in the city. One of the most beautiful things I saw the other day, in passing along a city street, was the Virginia creeper, so abundant in our timber lands, covering a large area on one side of a brick mansion. Now if I had a brick house, I believe one of the first things I should do, if possible, would be to plant this vine. It is lovely in summer, on this wall cares for itself, and makes a gorgeous though short-lived show before it drops its leaves. It is equally good on a log house, but does not seem to fancy climbing clapboards. Another pretty thing I saw was a hedge screen of privet. Now I knew this was a fine shrub, "almost evergreen" having pretty flowers that make up nicely in bouquets with roses, and I knew it could be used for this kind of hedge; but I did not know how very beautiful it could be. Perhaps the close-cut green sward in front enhanced its loveliness. This is an easy plant to grow, and I do not think it would require much labor to make a hedge of it, to separate the kitchen garden, the clothes yard, or the wood pile with its surroundings, from the grounds in front.

One more thing about trees. I propose that Arbor Day, inaugurated by Gov. Bagley in the centennial year, be a perpetual institution, and be supplemented by a day in autumn for the planting of ornamental shrubs, vines, and flowers about the homestead. Would not this bring a wonderful change in a few years to our rural homes. Another thing, could there not be arranged

among our farmers and horticulturists, a system of exchange, by which choice plants might be more widely disseminated, and a greater interest be awakened in regard to farm ornamentation?

FLOWERS.

What flowers shall the farmer's wife cultivate? She has so little time! How shall she get the largest amount of enjoyment from the means at command? Shall she order everything in the florist's catalogue that she may have heard is beautiful, or that the catalogue itself says is so? It is so tempting, that long array of names and descriptions! She loves beautiful things so much—she sees in prospective such a lovely flower garden! "Man wants but little here below," but when a woman thinks of flowers, there are sometimes so many things to want! Good friend, let common sense come to the aid of imagination. Do you know how to raise choice flowers? How much time can you give to their culture? Do you forget that the money invested is but a part of the price—that toil and experience only will bring large results? Look around among your friends and see what they have that pleases you. No matter whether it is rare or not, so long as year after year it will bring you and your children a gift of beauty that will fill your hearts too full for words. Put such as have only a short-lived beauty into the background, where their unsightliness when out of bloom will not offend the eye. Some plants only need room to root, to be ready for years together to come with their floral offering. Even the tough green-sward or an overhanging tree will not prevent their advent. I have a lily that yearly throws up its golden bells in such a place. Observation will give you much valuable information about such things.

Be sure and have plenty of roses and hardy climbers. How could June get along without roses?—and how cold and barren are our porches without the garlanding of vines! Even the grape will add home-likeness to the dwelling, and if the front is occupied with prettier things, this may well adorn the rear. You will need some annuals. Perennials, bulbs and shrubbery, though yielding large returns for little labor, do not quite fill the bill. The best way I have found to raise annuals is to devote a spot to them especially, have it thoroughly enriched, and well plowed—where the plants will bear transplanting, raise them in house, hot bed or cold frame—small boxes made of thick paper folded diagonally and fastened with a pin and packed closely in bed or shallow box, are very good to raise plants in and the plants can be set in the garden with little disturbance—giving them plenty of room in their final home, and hoeing them as you would corn. This may not produce the best landscape results; but there will be flowers for kitchen, dining room and parlor, flowers for the sick, for the children, and for friends. If you have taste enough to create a picture out of your grounds, and plenty of time, you may prefer a different management.

Among plants you may raise from seed, let me name, as horticulturists do fruit, a dozen very satisfactory kinds.

I place the verbenas first. It is a little trouble, but worth it. You want good seed, and should sow them early. Transplant all to one bed where you can see them daily and hourly. Put the plants at least a foot apart, hoe them a few times and let them run. Next may come the companionable pansy. Give it a shady place and wait till fall or the following spring for full satisfaction. The double zinnia, a grand flower for an annual; petunia and portulacca, for passers by as well as yourself; phlox Drummondii and white candytuft—sow

the latter in the open ground where it is to grow,—put these two flowers together in low dishes on the dining-table. Sweet mignonette and the old-fashioned pink and white sweet pea for fragrance, and for a delicate combination of bloom and greenness for small white vases, the asters—watch closely for the blister beetle,—perhaps a sprinkling of gas-tar water will dispose of them;—stocks—look out for the minute cabbage beetle or turnip fly on the young plants, and give them a sprinkling of water containing a little fish oil; for an annual climber get some of the best varieties of morning glories—these flowers you can depend on—if you have “good luck.” For a beautiful bulbous climber, take the Madeira vine—for the house or piazza, sow the *Thunbergia*; for a summer garden bulb, do not forget the gladiolas, and for autumn remember the dahlia.

Then there are the winter vases, calling for grasses and immortelles. I am sure the work I have laid out is too much for most of you, farmers’ wives, but how could I stop before?

Of house-plants I shall say little. My choice might not be yours, and circumstances may well control choice. I noted a few fine things at the fair that I should like to possess were I sure of success in their culture. There were beautiful begonias, a delicate centauria, and a splendid salvia, and of fuchsias a magnificent purple and red, the Tower of London, and the queen of the whites; of geraniums a fine scarlet double, the sapier pompier. If there were a little better opportunity to obtain information about choice plants, it might be of advantage to farmers’ wives who visit the fair, and possibly also to the greenhouse proprietors.

Hudsonville, Ottawa county, Mich.

Following the reading of Mrs. Crozier’s address, Mrs. M. A. Lessiter, of Grattan, took the floor and read a pleasing paper on

THE WORK OF THE FARM.

She announced herself glad that she was a farmer’s wife, and although there were many severe struggles and hardships to bear, there were enough pleasures to overbalance these; and if farmers’ wives looked rightly upon their mission and made the best of their opportunities, there would be less reason for the boys’ anxiety to leave the farm for other occupations. She was glad that our State had an agricultural college where the farmers’ boys could get a good education and still be connected with the operations of farm life under favorable circumstances, and thus, while growing in knowledge, develop also a love for the best calling in the world.

MARKETS.

Mr. Byron Markham, delegate to the convention from the Lake Shore Pomological Society, read an essay upon Markets, which is given in full:

With great diffidence, and only at the earnest solicitation of the friends of Pomology of western Allegan county, do I appear before you to read an essay—not on fruit culture—for I am not so presumptuous as to suppose I could teach the most inexperienced among you upon that subject, knowing as I do, my utter unfitness to even attempt it, and my only excuse for occupying your time at all is the partiality of my friends, and the great interest I feel in all that in any wise pertains to the advancement of the fruit interests of Michigan; but especially of the interests of those with whom I have cast my lot. I could

not hope to say anything that would interest you in any wise about the production, the care, or handling of fruit, for in these things I am still but an humble learner, and shall take it for granted that you know these things quite as well as any, and far better than most men. In quality or abundance no State surpasses us in proportion to the area cultivated; in the manner of handling and packing, our fruit-growers are superior to any of their competitors east or west. The beautiful appearance of our fruits when they reach the markets attracts the attention of the most casual observer.

But there is one subject which, it seems to me, has not received the attention its importance demands: I refer to the proper markets for our surplus fruit. I do not doubt that you have given the subject thought enough, or that you have been anxious enough to find these much desired places, yet I do not learn that this society, as a society, has ever taken any action in this direction, which I believe to be of as much importance as the production of fine fruits. The practice which so universally obtains at present, of sending everything to the large cities for distribution, in the absence of any united action on our part, is the only practicable thing to do. For any one man to attempt to reach all, or any of the small markets of the great west, with his products would be simply a waste of time and money. There is so much distrust of strangers all over the land, engendered by the often practiced tricks of unprincipled men, who, like the individuals spoken of in scripture, go about seeking—if not whom they may devour, at least whom they may cheat and defraud—that no one man is able to give assurance enough that he intends to deal honestly with them.

Moreover, there seems to be a necessity for some place where fruits may be had, and had at all times, in any quantity required. Hence the country dealer naturally seeks some such place as the Chicago market, where he is sure to find what he wants. And this fact being known to both the producer and consumer, they both seek the same market, the one to sell, and the other to buy. But this mutual accommodation is attended with a great outlay of time and money. Frequently it costs the consumer as much to freight his fruits from Chicago as it would direct from our orchards. Then he has the cartage to pay twice in Chicago, and the commission of ten per cent. once at least, and commission men are made of purer stuff than other men if they are satisfied with one commission.

Now it matters not which way you count this, whether the consumer or producer has the money to pay, it is certain that at least one-fifth of the value of the fruit shipped to Chicago, is paid to middle men, that might be saved to the consumer or producer, if the transaction could take place directly between them. But to bring about this much to be desired object is a problem, as yet unsolved.

That there is a demand for all the fruit which we do or can produce, I have not the slightest doubt, especially for that class of fruit for raising which we are so peculiarly well fitted. In all of the territory north of a line running west from Chicago to the Rocky mountains, and so far north as we can get, the inhabitants must depend upon Michigan for their supply of peaches and other tender fruits. This territory is larger than the original thirteen states and the next thirteen that were admitted into the union, and already contains a population of about five millions. When it has become as densely populated as Massachusetts, it will have about one hundred and seventy-five millions of people. Will it be possible for Michigan to supply all this people with fruit and feed our own population at the same time? In view of these facts, as I said

before, I have no doubt there is and will continue to be a demand for all the fruit which Michigan does or can produce. The great question then, is, how can this great market be reached quickly and cheaply? There is no doubt that in the transportation of perishable fruits like peaches, time is of more consequence than anything else. The sooner they can reach their destination, other things being equal, the fairer they will look and the better they will keep.

To do this we must in some way avoid the delays consequent on shipping them to Chicago, and there await orders to be again shipped to some other point, which might have been reached in the same time it took to send them to Chicago. I use Chicago only to illustrate my idea. The same principle applies to all central markets. My idea is, we must bring other markets to us, and that to do this, we must let all portions of this great market know where we are, and that we have the ability to supply them with all the fruit they may want, and of a quality superior to all others. To do this fruit growers must act in concert, and inform the consumer that there is a better market for him to purchase in than Chicago. To do this would cost some money. It should be done either through ordinary advertising, or by canvassers. The latter would be more effective, the first less expensive. But whichever course is adopted, it should be done thoroughly and no point left unnoticed that could be reached by the mails or otherwise. Every city, village, hamlet, and country store should be posted as to the time and place, when and where to order their fruits. Arrangements should be made with the great thoroughfares to have the fruits forwarded with the greatest dispatch, and the fewest possible trans-shipments. Purchasers should be advised of these arrangements, and which is the best route over which to have their fruits shipped. This renders it necessary that perfect arrangements should be made here for filling all orders received with as much certainty and dispatch as it could be done in Chicago.

The business there is not all done in one place, but divided among five hundred men, all working for one purpose, and when orders are received by one for articles which he has not on hand, he gets it from his neighbor and fills his order and returns the accommodation as opportunity offers.

With us, after we are sufficiently advertised, we must establish central offices in charge of competent persons, whose duty it shall be to attend to all correspondence and receive and fill orders. They should be furnished by each of the members of the association of the probable amount of each variety of fruit he will have to sell, then, when an order is received, they would know just whom to call upon to fill it. I would not like to enter into further details of this proposition as it may be thought entirely impracticable, and I should be loth to occupy time which can be more profitably used. I will only add that it appears to me that, beside the advantages already mentioned, it would prove mutually beneficial, to the producer in a more certain market, as his fruit would be sold as soon as delivered at his own port, to the consumer in receiving his fruit in a shorter time, consequently fresher and more valuable, to both in saving the expense and delay consequent upon employing middle men to do unnecessary work, which is a detriment rather than an advantage. The cost of commissions thus saved is enormous. One fruit grower alone in Saugatuck informs me that his commissions for this year have amounted to over \$1,000. What then must the aggregate be. Surely, if we could save but one-fourth of this, it is well worth the trial.

Mr. Markham's essay was well received, and it was generally conceded that

our society could not do better than devote a meeting to the question of markets and marketing. The next address was upon

THE GRAND TRAVERSE REGION AS A FRUIT COUNTRY.

BY J. G. RAMSDELL, OF TRAVERSE CITY.

MR. PRESIDENT—The country comprised under the general term Grand Traverse Region is bounded on the north and west by Lake Michigan, on the east by the meridian line, and on the south by an indefinite line running through the counties of Manistee, Wexford and Missaukee.

A portion of this country lying along Lake Michigan, around Grand Traverse Bay, and bordering the larger inland lakes of Benzie, Leelanaw, Antrim and Charlevoix counties—the parts of this country first settled—has become somewhat noted for the excellence and great variety of fruit which it produces, and the question to which I shall call your attention is the extent of territory in that region capable of producing the various kinds of fruit.

The capacity of a country for the successful growing of fruit depends upon two primary conditions, *the character of its soil* and the nature of its climate.

Dr. Rominger, in the third volume of the "Geological Survey of Michigan," has seen fit to condemn this country both as an agricultural and a fruit country, that is, that it cannot maintain the reputation it now has in these respects. One occupying the position of Dr. Rominger should be careful about expressing opinions of this nature without first having made a thorough personal examination of its soil, based upon extensive scientific research, and a study of its climatology, based upon something more than isothermal lines and mean annual temperature. A *scientist* should be careful about expressing closet opinions on the agricultural resources of a new and undeveloped country. Considering the high source from which this adverse opinion comes it ought not to be allowed to go unchallenged, I shall therefore take this opportunity to demonstrate, upon scientific principles, that the soil of this region is as rich in every earthy element, favorable to plant growth, as any country in the known world; and that its climate and topography are such as to favor the growth and ripening, over a large portion of its territory, of every variety of fruit, ranging in tenderness from the Siberian crab up to and including the peach and mulberry.

The mineral or inorganic parts of a soil are formed by the disintegration of rocks, and its character is determined by the composition of the rock or rocks from which it is derived and the manner of their disintegration. Rocks may be broken up, ground and more or less pulverized by mechanical power or dissolved by chemical action. By the first process all the mineral matter of the rocks remain as ingredients of the soil. By the second method a large portion of plant feeding material becomes easily soluble and is washed out and carried away. Ordinary granite rock, pulverized by mechanical power, would give a soil rich in silica, potash, alumina and peroxyd of iron, while if dissolved by atmospheric action the potash and alumina are easily dissolved and washed out by the rains, leaving a fine, barren, silicious sand.

The richness or fertility of the soil in mineral ingredients for agricultural purposes depends upon, and is in proportion to, the supply of those chemical elements existing in its derivative rocks, which are found in the ashes of plants. These are as follows:

ALKALIES.	ACIDS.	NEUTRALS.
Potash. Soda. Lime. Magnesia.	Sulphuric. Phosphoric. Silicic.	Chlorine. Oxide of Iron. Oxide of Manganese.

These are termed earthy matters, to distinguish them from those matters which are derived from the atmosphere.

If a soil is formed by the mechanical disintegration of one kind of rock, it will contain all of the elements of that rock, and no more. If that rock is magnesian limestone, it will have an abundance of lime and magnesia, but would not contain a sufficient quantity of the other earthy ingredients of plants to make a fertile soil. If we mix with this the soil from disintegrated sandstone, we add silicic acid, and if it is highly impregnated with iron and manganese, as most sandstones are, we should have a sufficient quantity of those elements also. If we mix with this plaster rock and lime rock, containing large quantities of fossil shells and bones, sulphuric and phosphoric acids will be supplied. Granite added will give us an abundance of potash from its feldspar and mica. Add to this material derived from a salt formation, and we have chlorine and soda; though this is not material, as these elements usually exist in the other rocks named in sufficient quantity for all agricultural purposes. A soil thus formed would have all the earthy elements which enter into the composition of plants. But a soil containing these properties, or earthy matters alone, no matter in what proportion, would not be, without the addition of other matter, a very fertile soil. It must have other substances which, although they do not enter directly into the composition of plants from the soil yet act as agents in the process of separating these elements from the soil, and preparing them for absorption by the roots of plants. The principal of these other matters are alumina, carbonic acid and vegetable mould. The two first would be amply supplied by the lime and granite rocks; the latter must be supplied by decayed vegetation.

It matters but little in what proportion these elements exist, providing there is a sufficiency of each to fully supply the demands of successive crops, and the silica (common sand) so far predominates as to make a porous and friable soil. A soil may be composed of seventy-five per cent. of silicious sand and yet be fertile, if these other elements are there in sufficient amount. Pulverizing and mixing together these rocks, with the addition of from three to five per cent. of vegetable mould, would make a soil rich enough for all practical purposes, without the application of special manures, and without danger of early "wearing out."

The surface of this country is covered to a great depth with what geologists term *drift*, a mass of earth which has been formed by the breaking up and grinding together of rocky masses by glacial action, until they have become pulverized and mingled together into a more or less homogeneous mass of sand, clay, gravel, and boulders.

The rocks from which this drift is derived are those which out-crop between the northern terminus of the Lower Peninsula and the southern shore of Lake Superior. These rocks or geological formations, commencing at the mouth of Grand Traverse Bay and going north-northwest in the direction from which

the drift came, are as follows: First, the Helderberg group, composed of a clayey carbonate of lime, abounding in fossil remains. Next is the Onondaga salt group, a narrow out-crop on the north shore of lake Michigan, near the straits, and underlying the bed of the lake, containing plaster and water-lime beds. Next is the Niagara group, a narrow out-crop, composed of crystalline magnesian carbonate of lime.

Next is the Hudson River group (I omit the Clinton group, which is not known to out-crop in that direction), composed of clayey shales underlaid by blue limestone. Next is the Trenton group, also a limestone formation. Next Calciferous and Lake Superior sandstone, highly impregnated with the peroxid of iron and manganese. Next is the Azoic formation, a name given to the lower stratified rocks, which contain no fossil remains. These rocks are composed mostly of lime, alumina, silica, and iron. Next the granite, composed mostly of quartz, felspar and mica; and, lastly, the Trap rocks, composed of potash, alumina, silica, lime, magnesia, manganese and iron. All of these rocks have contributed their quota to the general mass of drift that covers this region. The great eruptions which threw up the granite hills of the upper peninsula and formed the basin of Lake Superior, also depressed the whole interior of the lower peninsula, forming a great geological basin,—thus giving the whole rock strata composed of the above formations a southward dip from Lake Superior to the center of the basin, leaving the upturned edges of the different formations overlapping each other like the shingles of an inverted house roof. These upturned edges were broken, worn, and furrowed by the great ice-flows of the glacial period, that came down from the north-northwest, scooping out the bed of Lake Michigan from the softer rocks, and mixing and pulverizing the debris and detritus of the different formations, in its southward course, into one conglomerate mass, spread it over the land, and deposited it in the morains whose peaks and ridges are conspicuous landmarks from the valley of the Muskegon to the mouth of Grand Traverse Bay. As proof of this origin, we find blocks of granite of all sizes, from that of several tons to the pebbles on the beach, scattered over the country; also blocks of trap in the same manner, and lime stones and lime gravel, which correspond exactly with the foregoing lime formations in structure, material, and organic remains. Fragments of the various limestone formations are found in the greatest abundance in every variety of soil, at all elevations, and in every variety of form,—in massive blocks, angular fragments, broken slabs, rounded nodules, worn gravel, tiny scales, and sand-like grains. The fossil remains of the Helderberg group are scattered in the greatest profusion all over the country, and can be gathered with little search from every cultivated field.

The soil being derived from this source, contains all the earthy matters that the highest fertility requires, and that in lasting abundance. Being composed of such a variety of materials, in such a varied state of pulverization, it is very porous, and susceptible to atmospheric influence to a great depth and to a high degree. The air, mingling freely with the porous soil, slowly acts upon this great store-house of alkaline material and renders it soluble in water and ready to be used in building up the organic structures of plants.

It is this abundant supply of soluble alkaline matter that covers our uplands with such an immense growth of maple, ash, and elm timber, the very species that require the greatest supply of that material. So great is the supply of calcareous matter, that in boiling down the sap of the maple, in the manufacture of sugar, a large amount of malate of lime is always deposited at the bot-

tom of the kettles. The quantity of this material is so great in the sap of the maple that it interferes materially with the manufacture of sugar. With a soil thus formed the drainage is perfect without the aid of ditches or tiles to carry off the surface water; so perfect that the most rapid melting of the large body of snow which accumulates every winter makes no perceptible wash from the hills to the valleys, and the heaviest rainstorms seldom gully the cultivated hillsides so as to damage growing crops.

But rich as the soil is in the *mineral* ingredients necessary to the most favorable growth of plants, it is deficient in vegetable mould, although tons and tons of vegetable matter have annually fallen with the leaves of the forest for ages, and generation after generation of timber has fallen and rotted upon the ground; yet on the uplands from one to three inches of vegetable mould is all that remains. This is a necessary result of such porous soils. Vegetable decay is slow *combustion*—the union of the oxygen of the atmosphere with the carbon of the woody fiber, which breaks down the structure and sets the earthy elements free. When this combustion is perfect, as when we burn wood in the open air, the carbon all passes into gas, and mingles with the air from whence it came, and nothing but the ashes remain. But when we burn it in a closed oven or pit, where the air is partially excluded, we have charcoal as the result; a substance containing the principal element of vegetable mould; or, rather, vegetable mould is composed principally of that substance. In the swamps and marshes, and around all the springs, fallen vegetation becomes more or less saturated with water, and remains so, whereby the air is partially excluded, and the combustion which takes place is similar to that which takes place in the oven or coalpit, and a large quantity of carbonaceous matter remains: so that the muck in such places accumulates to a great depth. On the dry lands it is different; the complete drainage of the surface by the porous subsoil leaves the air free to come in contact with every portion of the vegetable tissue, and the combustion is so nearly complete that but little more than the substance of the ash remains. The melting of the snows in the spring, and the frequent rains of the summer, dissolve the gum and break down the cellular walls which form the woody fiber, then passing off by drainage and evaporation, gives the oxygen of the atmosphere free access to every carbonaceous atom. The damper the soil, the greater the depth of mould. It is deeper upon the north than upon the south-side hills—deeper in the valleys among the hills than on the flat levels below them. The commonly received opinion that the muck in our swamps is formed by the washings from adjacent hills—however true it may be in other regions—is incorrect as to this. The river flats down to the lower terrace are as destitute of mould as the hills. The rains and the melting snows go into the ground, and find their way to the streams through the living springs, which give a uniform volume to the rivers, varying but little throughout the year. They seldom overflow their lower banks, and therefore spread no alluvium upon their flats. For this reason the river flats or bottom levels are generally less fertile than the hills. A soil so rich in mineral and earthy matters will never wear out, but with judicious farming will grow better and better as the vegetable matter is increased by tillage.

TOPOGRAPHY.

Passing along Lake Michigan from Manistee to the mouth of Grand and Little Traverse bays, one will observe a succession of bluffs, varying from three hundred to five or six hundred feet in height. These bluffs are the lakeward

termini of a succession of elevated ridges, running back into the country until they are lost in the table land of the interior. In Benzie, Manistee, Wexford, and the south half of Grand Traverse counties these ridges run nearly east northeast. In Leelanau, Antrim, and Charlevoix they run about south-southeast. Where these ridges meet they form elevated table lands, from which the main water-courses take their rise. Those of Benzie and Leelanau counties meeting in the west of Grand Traverse county, form the level plateau surrounding Long lake and the Betsie lakes, from which the Platt and Betsie rivers take their source; and those of Manistee, Wexford, and Grand Traverse meeting with those from Antrim and Charlevoix, form the high plateau of Kalkaska, Crawford, and Otsego, from which rises the Boardman, Manistee, and Au Sauble.

Lateral valleys running down to the lakes, bays, and main water-courses, break the whole country bordering on Lake Michigan, Grand Traverse Bay, Little Traverse Bay, and the lower inland lakes into undulating hills varying from fifty feet to four hundred feet in height, but not so abrupt as to prevent easy and successful cultivation.

Around Grand Traverse Bay and the inland lakes, from twelve to fifteen feet above the water there are terraces from a few rods to a half mile in width. The first settlers of the country located upon these and built their buildings and planted their gardens and orchards. I am particular in describing the topography of this region on account of the important part which these ridges, hills, and inland lakes play in modifying the climate and preventing extremes of heat and cold, of which I shall speak under the head of "Atmospheric Drainage" as affecting temperature and protecting fruit.

CLIMATE.

This I consider the most important to this region of all the subjects under consideration, and the one which, when fully understood, will be found to exert the most favorable influence upon its agricultural and fruit-producing resources. A soil deficient in one or more necessary ingredients may be improved or perfected by artificial application; but for agriculture or fruit culture we must take the climate as we find it. True, we may protect our fields and orchards from high and injurious winds, by planting or preserving belts of timber upon the windward side, but otherwise must depend entirely upon causes beyond our control for the climatic influences which favor vegetable growth.

The climate of this region is perhaps the least understood, and at the same time the most generally misunderstood, by those who have not "summered and wintered" within its limits, of any of the subjects discussed. The general opinion of such is that this is a cold, bleak land, too far north for a successful farming or fruit-growing country. Their whole reasoning and conclusion is based upon the mere naked fact of latitude. People from northern Ohio will tell you that they fail with certain kinds of fruit there on account of frost, and *therefore* we must fail here, for this is three hundred miles further north. People from New York and southern Michigan will tell you that they cannot raise certain fruits there on account of frost and therefore they cannot be grown here, for this is two hundred miles further north. The same objections are made and the same reasons urged by visitors from the older prairie states.

Of the hundreds of persons who visit me every season to make inquiries concerning this country, nearly all come prepossessed with the opinion that this is too far north for a successful fruit-growing or even farming region, and are

surprised to find apples, pears, peaches, plums, apricots, nectarines, cherries, quinces, mulberries, and grapes, all growing luxuriantly and bearing heavy crops of fruit without manure and with very indifferent culture, and they are equally surprised when they find the size, beauty, and quality of these various fruits equal and in some respects superior to the same fruits grown further south. They forget that latitude is not a true index to the temperature of a climate; that the isothermal lines, in passing around the world, go up and down through many degrees of latitude; that the elevation of the land in proximity to large bodies of water, the direction of the prevailing winds, and the quality of the soil, all exert an influence upon climate, independent of mere latitude. It is for the purpose of correcting the false impressions which prevail to so large an extent concerning our soil and climate, that I have consented to address this Society upon this subject.

While the mean annual temperature of this region is undoubtedly lower than in the latitude of Southern Michigan and Ohio, it is nevertheless a fact that the thermometer never falls as low in its utmost extreme in a large portion of this country, embracing the rolling lands mentioned, as it does in latitudes three hundred miles further south, and damaging vernal and autumnal frosts are unknown. It is not the mean annual temperature of a country that determines its capacity for fruit production, but the extremes of heat and cold and the liability of damage from late vernal or early autumnal frosts. The deep waters of Lake Michigan, Grand Traverse Bay and the inland lakes act as a great thermal regulator receiving and retaining the heat of summer to yield it back again to temper the rigors of winter. The great depth and volume of these waters receiving the heat of summer from the sun, the wind and the rain, and the vast number of streams that pour in from every side, form a reservoir of heat which the coldest winters of the latitude cannot exhaust to the freezing point. The heavier the winter storms, the more powerful the action of the water to temper its severity. No storm from south, west, or north, or any point of the compass between, ever reduces the temperature much, if any, below zero anywhere in this region. That coldest of all storms, known as the New Year's storm of 1864, reduced the thermometer to only 12° below zero at Traverse City, forty miles, on the line of the winds, inland from the lake shore.

The manner in which the water acts to temper the air so much more in storms than in still weather, is simple, and easily explained. When the surface of the lake is smooth and the air still, only the lower surface of the air and the upper surface of the water come in contact. When the breeze grows fresh, then the billows commence rolling, and the under-current of air is broken against them, giving it a rolling motion, bringing more of the air in contact with the water, and when the wind increases to a gale, the billows break, the spray and foam leap into and mingle with the air, and the heat of the water is thus absorbed by the air many times more rapidly than when the water is still. The air, although unseen, is in much greater commotion than the water. Striking the billows, it rolls under and rises again in constant ascending and descending whirls, and thus for an hundred miles it dashes on through foam and spray, sweeping the crests of the billows, and absorbing heat so rapidly that when it reaches the east shore it is mild and bland compared with the freezing fury in which it swept the western prairies a few hours before.

The lowest point which our thermometers register during the winter is always reached on some clear still night when the influence of the lake is less felt. It is on such nights that the peculiar topography of our country exerts its favora-

ble influence to prevent injurious freezing of trees and buds during winter, and injury from frost during spring and fall. For the same principles that govern the phenomena of ordinary frosts governs that of extreme winter cold in this region. And for the purpose of making this clear I will occupy a few moments in explaining the philosophy of ordinary frosts. Every one has observed that ordinary frosts vary greatly in their severity, low places, level lands and basins or depressions suffering more injury than side hills, knolls and ridges. On a clear still night heat radiates from the *surface* of the earth into space. As this radiation goes on, the surface grows colder and colder, if level the air remains stationary, and falls in temperature with the surface of the earth, at first the moisture of the air is condensed and forms dew, at 32° Fahrenheit it is crystallized into hoar frost, if it sinks still lower the sap of tender plants is frozen, expands, and bursts or injures the cells and kills the plant. Cold air is heavier than warm air, and the colder it grows the heavier it gets. On side hills, knolls, and ridges as radiation cools the surface, the air becomes heavier and runs down the hill to the valley or plain below, and warm air takes its place; this in its turn grows dense and passes down, forming a current of air down the hill, leaving none of it at rest long enough to reach the freezing point. If the valley is enclosed so as to form a basin, the cold air "draining" into it may fill it up so that the frost will reach up the side hills to the level of the dam which encloses it. But where the drainage reaches a body of water, heat escaping from the water re-heats the air, causing it to rise again and flow back to take the place of that which is flowing down the hills. In the coldest nights of winter the difference between hillsides and enclosed basins is surprising. In one case Messrs. Avery and Marshall, of Old Mission, found a difference of 22° in less than one hundred feet elevation, and Messrs. Parmelee and Brinkman 11° in fourteen feet. Where the valley or hillside opens without obstruction to the bay or lakes the difference is not so great. I find on my farm, which descends rapidly towards Grand Traverse Bay, a difference on such nights of from four to six degrees per each hundred feet, and in one instance, February 9th, 1865, the coldest night ever known in this region, it varied ten degrees to the hundred feet. When we consider how close the margin is between absolute exemption and total destruction of the tender varieties of fruit trees by freezing, we shall see how important this matter of atmospheric drainage is. With -12° the peach is comparatively safe, at -15° the tree is in danger, and -22° is almost certain destruction. An hundred feet elevation, with open drainage to water, may determine the difference between a crop of peaches and a dead orchard. And in an enclosed valley or basin twenty feet may do the same. If my reasoning and conclusions are correct, it is easy to determine the extent of this territory best adapted to the general cultivation of fruit. Upon all the hillsides with free atmospheric drainage to Lake Michigan—Crystal Lake, Glen Lake, Carp Lake, Grand Traverse Bay, Elk Lake, Round Lake, and Torch Lake—peach orchards may be planted with as much safety from winter killing as at any place north of the latitude of Cincinnati. Upon the terrace around Grand Traverse Bay and the lower inland lakes, where the orchards of this country were first planted, the winter of 1875 demonstrated that it is unsafe to plant peaches, plums, cherries or pears. And upon the level plateaus mentioned nothing but the hardiest trees should be planted. But grapes may be cultivated with success upon every hillside in the whole region where the elevation above the nearest level is sufficient to protect them from late spring and early fall frosts; for if pruned and laid down in the fall as they

should be, the deep snow of our winters will cover and securely protect them from winter killing.

In confirmation of what I have said concerning the superiority of the soil and climate of our region for fruit growing, I call your attention to the fact that we have formerly taken first premium for best Delaware vineyard in the State, and have this year taken first premiums for best pear orchard, plum orchard, cherry orchard, raspberry garden and ornamental grounds, and want of age alone prevented us from obtaining first premium for apple orchard; while our fruits, wherever exhibited, have taken a large share of first premiums, and our apples at our State fairs, at the Centennial, and wherever exhibited, for beauty of color, perfection of form, and excellence of flavor, have stood confessedly without a rival—demonstrating the fact that if the apple is the king of fruits, then the Grand Traverse region is the seat of his empire.

The next discussion was opened by Secretary Chas. W. Garfield upon the question,

HOW SHALL WE EXPERIMENT?

The question that stands as an index, or rather a suggestion, to the few remarks I am about to make is assuming greater importance with the years, because people are looking more toward empirical knowledge for help than formerly, and are paying less attention to theories, traditions, and prejudices. There is the same continuous thirst after new things in every department of life, and horticulturists are no exceptions. A beautiful theory may invite the attention, even although it may have been originated by one who has never performed an experiment; but it will not long satisfy. Our people want facts that are the result of careful observation and experiment. These they can take hold of and incorporate into their own methods. But however true this may seem, this thirst after new things is so strong that careful, well-directed experiment can not come fast enough to satisfy, and there is a manifest tendency to reach into the beyond and grasp for something we hope is there, believe is there, and often we name it before we reach for it, then grasp only vacancy and, as we hold up our hands to show what we have, are surprised to find nothing there.

The desire for sensation stimulates into activity the imagination, and mere thought takes the form of reality. This is, in popular language, theorizing—the very thing that most of us condemn and ridicule, and still the very thing we are doing every day unwittingly, in one way or another.

It is so easy to let the imagination do the work, and so quickly is it done. While on the other hand, careful experiment requires so much attention, care, and thought, that it is a great temptation to let the former take the place of the latter.

One may start out with an honest intention of conducting a careful experiment and, after following it for a time, the final result seems so evident that the temptation to “run across lots,” thus gaining time, is too strong, and a portion of unexplored territory remains behind. The great majority of “I believes” among farmers and fruit-growers are made up of just such experiments as I have indicated, and nearly the whole of them are entirely worthless because of the lack of the connecting links of careful observation that were lost by running across lots, or in other words, jumping at conclusions.

We cannot put too high an estimate upon actual knowledge—hard facts—

that come by digging honestly and earnestly after what may come regardless of any preconceptions. As the country grows older and there is a greater population to support, these facts become of greater importance; hence the need of advancement in this matter of experiment and recording honestly the results. The question, then, of how to experiment assumes a more prominent position, as we need the results to assist in increasing production.

It may be remarked "you are making a straw man for the purpose of knocking him over." This would be a natural remark; indeed, after glancing over the pages of any of our agricultural or horticultural publications of the day, one ought not to think there is so much difficulty in experimenting when so many are at it—and apparently with success—for in each number of the weekly papers are there not several exhaustive articles detailing the results of experiments? The world seems full of experiments, so it would seem foolish to try to make them out as difficult things to manage.

It is this fact that there are experiments without end, and so little real progress as the result of it all, that gives emphasis to our leading interrogation. The fact is that the larger portion of these so-called experiments are worth nothing,—worse than this, their value is a minus quantity, because they are calculated to mislead. They are nearly all of very short duration, and these are thrown upon the public, to be swallowed by open mouths,—yes, so very wide-open that the eyes are shut against the theory that dangles to each one and that goes down too.

Glancing over the papers that have come to my table the past week, I find three remedies for pear blight,—the result of careful experiment. For each is claimed originality, perfectly satisfactory results, and each is recommended to pear culturists everywhere as a discovery long sought and finally found. Two of these startling disclosures are made after one year's trial, the other has had double that time to prove its worth. All of them to my certain knowledge have been in print before and were lost sight of because perfectly valueless.

A man at Muskegon, in our State, a few years ago made a discovery, the result of careful and thoughtful experiment *one year*, that salt was sure death to cut-worms. He felt that that one experiment of sowing a sprinkling of salt upon his garden (where there was no end to the numbers of cut-worms the year previous) and noting the fact that this particular year nothing was injured, was worth thousands of dollars to the poor sufferers along our western shore, that had been eaten up by cut-worms. Everybody tried salt the next year; strange to say, there seemed to be no general and wide-spread freedom from cut-worm ravages that was expected. Prof. Tracy, up at Old Mission, thought he would see what was the matter; so he caught some cut-worms and put them in the salt barrel where they could have the full benefit of a generous supply. The little "varmints" lived and burrowed in it, for some days, and some of them finally died, as any one else would with nothing to eat but condiments.

A man out in Iowa discovered that coal tar smoke would effectually drive away the curenlio. If he had simply stated the facts, that by the use of coal tar smoke he drove the curenlio from his trees to others that were not smoked, he had done well,—but no, he had discovered by experiment a remedy for curenlio. Subsequent trials have shown that where all the trees are thus smoked in a neighborhood the curenlio still works as much as ever; in other words, accommodates himself to circumstances.

Another experiment of a similar character was that of Dr. Hall's with lime to drive away the codling moth.

As a last example of these experiments that fill the newspapers, I will cite an instance that comes nearer home. A few years ago I performed a series of experiments with potatoes, planting in sections and adopting a different method with each section or plat. When I came to dig the potatoes there was one plat that yielded a very large amount of tubers proportionately, and it was the plat upon which I had practiced pruning the vines. The variety of potato was one that in common terms "ran to vines," a strong growing sort, and this result indicated that the checking of the top by trimming had created a tendency on the under-ground root-stalk to set tubers. I stated the facts with a careful record of management, weight of tubers in various plats, etc., in a newspaper article contributed to a leading agricultural periodical, and appended at the bottom the statement, that this was but one year's work, and another might indicate a contrary conclusion. The figures caught the eyes of a good many agricultural editors (being one myself I know how it is), and the article was soon to be found in all the leading agricultural papers, in one form or another, but in almost every instance the figures were given without the added remark of mine,—which indicated their small value,—and worse than all, in many instances it was lauded as a new thing in the potato line.

I have continued that experiment, and find my first results are not liable to be duplicated; in truth, my succeeding experiments indicate that there is little or no increase in yield as the result of pruning the tops; and as for the experiment being a new one, those who carefully look over the agricultural literature of the past century will find the same thing has been recorded before, time and again, with the same satisfactory results, but never has become a practice because there was no real merit in it.

So much for the literature of experiments. Let me say further that I scarcely go anywhere but that I find men are experimenting, in their way, and are constantly arriving at valuable results that guide them in their practice. This is their own statement of the case. These results are generally sources of continual error, and act as a snare rather than an assistance in the operations of the farm and garden. The worst of it is that they have obtained such a firm hold upon the people that there is no possibility of eradicating it. Advancement is thus checked and production decreased rather than augmented. As an illustration of experiments of this character, I will name those which have resulted in the popular notion that wheat turns into chess. I have no patience on the other hand with these scientific men who simply settle back in their chairs and say, "This is a preposterous idea, a simple prejudice grown to large proportions, and is so at variance with natural law as to be impossible," and consider the question settled. But I do commend the attitude of the leading botanist of our State, and who is with us here, who says, "Send me your chess that is turned from wheat, and when you find a shell of a wheat kernel at the base of it as the foundation of its life, I will believe you have an observation that is worth something." Still, in every instance where the roots have been carefully washed the original chess kernel has been found. Long theories have been spun out to account for the change of one genus of plants to another, when the fact of such a metamorphosis has never been observed.

The firm hold which this error has upon the people shows how necessary it is in order to know the truth that we all know better how to observe—how to experiment.

The influence of the moon upon the planting of seeds and upon the changes in the weather, are further examples of the errors that may be a part of a very

widespread belief. I say errors, because there is no long continued set of observations that support them; on the contrary the best records made by the most competent men are against them.

Further illustrations might be indulged in to any extent, but you can all recall them in the experience of your neighbors, and, if honest, in your own experience.

THOROUGH AND WELL DIRECTED EXPERIMENT TENDS TO OBLITERATE PREJUDICE.

The power of facts is supreme. The believer in the transformation of wheat to chess may doubt your reasoning when you tell him the impossibility of it in nature's economy, but when he brings you a sample of this chess and you show him after carefully washing the root the original chess kernel from which it sprung, he will not doubt his own vision.

I have an example of this in my own experience. I was told that in a certain orchard in northern Ohio a tree bore apples that were individually half sweet and half sour. I argued against it, said it could not be so, until I was taken into the orchard, shown the tree, and given an apple to eat. I could not deny the testimony of my own palate. It may be difficult to make theories comprehensible, but facts are generally very simple and can be understood by anybody. What we need then is more plain, simple facts, the result of honest observation. Thomas Andrew Knight believed that varieties propagated from buds deteriorate, become unhealthy, and die at about the age the parent stock should die, acknowledging that there was more or less invigorating influence in new stocks upon which the buds were transplanted, he still believed that every plant had its day and would not bear indefinite propagation from buds.

If he could to-day see the varieties of fruit that have been propagated from his day in this way, and witness how perfect are the varieties, with no apparent diminution in vigor or excellence, he would be greatly shaken in his theory.

For a long time it was supposed by gardeners that the use of potsherds for drainage of plants in pots was absolutely essential to the health of the plants, small and large. Peter Henderson, by a successful practice of years, has shown that there is a great deal of fallacy in this notion; his facts are too much for the theory.

Experiment well directed, helps people to understand the necessity of going to the bottom of processes and methods before too general an application. Surface indications are soon seen to be very untrustworthy, and it is found to be more satisfactory to know a little and *know it*, than to believe a great deal, with only a shadow for a foundation. Satisfactory experiment requires

ABSOLUTE SIMPLICITY IN METHODS

For two prominent reasons:

1st. Any complication is liable to divert observation from the real work, and the result will be a warped judgment and worthless decision. For instance, if one is pruning on a tree at different seasons to observe the relative rapidity with which the wounds heal, he must not at the same time be pruning that tree with the idea of producing wood on one part and fruit on the other. Nor should he try the effect of thinning the fruit on that tree with the expectation of watching the result and getting at some principle. All this complicates the first experiment so much as to render the decision at the end of it questionable.

2d. There is danger in trying to establish too many facts at once,—that we

shall get hopelessly lost in a labyrinth of testimony and give the theory up in disgust. A man may be a pretty good swimmer with nothing to hinder him, but with a covering of winter clothing and a drowning man hold of each leg, he may be lost himself; so in experimenting one may be skillful in watching a simple process for a negative or positive result; but when he so places his experiment as to be perturbed to a considerable extent, he may be far from sufficient to get at a correct judgment.

Again, proof positive upon never so small a point is worth a good deal as a stepping-stone to other judgments of more sweeping application: hence there is great value in absolute certainty of little decisions, the result of experiment, in reaching out after facts of greater import.

And one further reason I might mention for perfect simplicity of methods. We do not experiment for ourselves alone. The very fact of our performing a careful experiment indicates a benevolent purpose; and if our work is for the world, it should be so simple in its processes as to be easily comprehended by all who are to be benefited by its results.

WHAT IS NEW?

To be a successful experimenter one needs to have some knowledge of what has been accomplished in the department he takes up for investigation, and as I have already indicated, the history of any branch of agriculture or horticulture will show that a great many things have been tested, over and over again, by persons ignorant of each other's work.

We scarcely pick up an agricultural paper without finding something that claims the attention of the reader because it is new and original, and thoroughly good. Glancing them over, in one there is a "new method of cultivating wheat" that attracts the attention. It may be new to the author, but to the world it is as old as the Christian era, for Virgil describes the same process in detail. Turning to the horticultural department of the same paper, the leading article assumes to teach a "new method of training the grape," and gives the advantages of the process, which, if truthful, would certainly entitle the method to the term "good." But when the writer assumes it to be new, he exhibits the fact that he is unacquainted with the history of grape culture even in our own country, for turning to an early volume of the *Cultivator* we find the same method fully illustrated and explained.

A scientific man who can lay claim to a large amount of general information and who evidently is a careful student and ripe scholar is giving in one of our papers "A new theory of tillage," and still, after a careful perusal, one who has a good library of agricultural works from Jethro Tulle down to Waring can open to places here and there where he will find, not only this same theory carefully given, but great quantities of facts upon which the hypothetical method rests.

Pear blight has a new theory devoted to it every few weeks, but nearly all of them that have any claim upon our attention are simply a rehash of an old theory, and generally as worthless as they are old. A gardener of considerable note in a recent paper gives "a new method of propagating soft wooded plants." The great advantages of the process are given in detail, but a picture in a book upon a shelf in my library, fifty years old, gives a clearer idea than all his words of the same process.

This discovery of new things and new methods and new theories is largely a piece of imposition upon the agricultural editors, who cannot know everything

nor remember all the things they read and hear, or who do not possess a library of sufficient capacity to protect them from these pseudo-new ideas.

The question arises, what is new, and in what field can the agriculturist and horticulturist dig for things that will be new to the world?

The answer to the first question is very difficult to give, and when one goes over the history of rural pursuits and notes how many processes and systems that claim originality with recent writers are old and tried, he is almost ready to exclaim, "There is no new thing under the sun."

The answer to the second branch of this question I will indicate farther on.

In learning what has been done we fit ourselves for better work, for we can profit by the mistakes of those who have entered the field in advance of us. Several men moving across a marsh at intervals will not be liable to all sink in the same hole. Those coming later will avoid the place where their predecessors sunk through. So in experimentation accurate knowledge of former experiments may save us a great deal of time and expense, and may aid us to strike more quickly at decided results.

REQUIREMENTS FOR, AND RESULTS OF JUDICIOUS EXPERIMENT.

The fear that the requirements are such as to forbid ordinary persons from experimenting, need not deter any one from work of this character. Many simple, yet important experiments can be performed in connection with the work of the farm and orchard, while the more elaborate ones must be undertaken by those who are drilled for it, and who have the ability, time, and money to expend.

Here I wish to call your attention to the work of our Agricultural College. It is the opinion of many that here is the place of all others, where experiments are to be performed upon all rural matters, and it seems strange to them that in all these years there are not more decided results. This is not my own opinion of its work. To be sure, experiments should be performed there, and many can be carried on under more favorable circumstances and conditions than at any other place in the State, but the leading work of the College is not to experiment, so much as to make experiments; to train young men for agriculture and horticulture, in such a manner as to make them fitted to take hold of questions of practical bearing upon their occupation, and work out solutions. The College ought to answer for its students the question I asked at the beginning, and the work of experimenting they should do after they go out from there.

When I was a teacher in the common district school, it was the custom for all the old heads in the district to send in to the teacher all the tough problems that had come down in the families for generations, and unless the poor pedagogue could give a quick and satisfactory solution, he was not considered worth much, no matter how well he taught the school. No greater error could be committed.

So I think we must not expect our Agricultural College to work out tough problems in agriculture for us, in a day, or a year, or a decade; but we have a right to expect that the young men who are there educated, are fitted to perform experiments and do work that shall be a great benefit to the State. Just as the character of an orchard can be judged by the quantity and quality of the fruit stored for winter, so can the value of our farmers' college be measured by the fruit which those who go out from her can exhibit years after they have left her walls.

If it is somewhat difficult to perform an experiment that is of real value—and if one is very liable to tread upon territory that has already been investigated, the question arises, What shall be the character of our work in this direction and where shall we look for something new? The knowledge we desire to obtain is both scientific and practical, and one sort should not be sought to the exclusion of the other. We want to know the truth first of all, and in all our investigations it is of the highest importance that we eliminate every possible source of error from our methods. A fact in science must be a fact, not a supposition or a guess, and after we have established it our next desire is to find its practical bearings in the work we have in hand, out of which we gain a livelihood. For instance, the question often occurs, does the sap-sucker actually dig for sap or does he dig for insects? When once we know an answer to this we can and will next inquire, What bearing has this knowledge upon the care of our orchards and ornamental trees, where we most usually find this bird does its work?

Then in answer to the interrogation of where we should look for new questions to solve,—or old ones that are not yet settled, I will say, that in the production of new varieties of flowers and plants for the greenhouse and border; new and hardy improved vegetables for the garden; new and hardy fruits for the orchard; new and better adapted grains for the fields, we do see an opportunity of originating things that are really new to the whole world. And when it comes to the adaptation of methods of culture and kinds of fertilizers, especially suited to these new things, we may be working upon an old principle, but our detail of facts will be new.

Probably the richest field for discovery in horticulture to-day is in the production of new varieties adapted to special systems of culture, or to peculiarities of climate and situation that in themselves are unchangeable.

As to just the method to pursue in carrying on these experiments I have condensed in a few sentences my own convictions:

1st. There must be a basis of knowledge from which to work. That is, one must know something of what has been done, and how to go at work upon the case in hand; he must understand how to so simplify his work that the results shall not be rendered nugatory by complications.

2d. There must be a distinct purpose in view. I do not mean by this a point to prove. For this in itself would so warp an experiment as to render its results worthless. He who closes an experiment by the comment on the results, that he knew it would come out so, was not fit to perform the experiment at all. By a definite purpose, I mean that one should have a clear notion of what he is at work upon, so as not to be led off from careful observation in the direction of his experiment.

3d. An experiment needs to be performed with great care. It must not be put off or shoved aside for anything else when it demands attention. If it is worth attempting, it is worth all the care necessary to make it perfectly satisfactory.

4th. In performing an experiment there should be absolute honesty. The moment we doubt the veracity of one who experiments we lose confidence in any result he may give us. It will not do to think a certain result is seen, one *must know* it. There is nothing that is to be done in this world that requires a greater degree of veracity and honesty than this matter of experiments, and when one prominent experimenter fails in this regard, we are apt to distrust others even more than when a minister falls from the path of rectitude.

5th. Experiments should be performed with liberality. I refer now more particularly to horticultural experiments. They should be the property of all who will be benefited by them. The time, money, and thought put into them should be donated freely for the good of the world.

And now, if you will bear with me a moment, I will state what appears to me as the results of this kind of work, and then close.

The acquirement of the very best kind of knowledge I will name as a first result. Knowledge that can be employed in practical occupations, as well as in gaining further desirable information.

The work of experimenting in itself is the best kind of a school for the development of the keenest powers of observation, and good observers are more needed to-day than any other class of people to forward scientific and practical research. And again, when we have performed a successful experiment and established a fact, we have added just so much to the world's stock of knowledge, and thus we have been a benefit to all generations, and have not lived in vain.

Lastly, there is a great satisfaction that comes with the establishment of truth, the unearthing of facts, and the building of foundations for principles. It is a wholesome satisfaction, and as long as one uses the knowledge thus obtained for the benefit of all whom he can help, he is justified in feeling good over what he has done.

There is no field of experiment in which there are more affecting circumstances beyond the control of the manipulator than in agriculture and horticulture, but because so little has been accomplished and so little progress been made need not deter us from working away, perfecting our methods, and making the best possible use of what is already known in the acquirement of a knowledge of new facts and new principles.

James Satterlee, of Greenville, was called upon to continue the discussion of the Secretary's paper and made the following remarks:

Experiments in general, it seems to me, belong to that class of work that doesn't pay,—in dollars and cents, I mean. And yet, should any one ask me what has led to the many discoveries made and improvements brought about in agriculture and horticulture, I should be obliged to answer, experiments. We frequently see the statement that farmers are too conservative; too willing to follow the ruts made by their fathers as regards methods of culture, etc.; too timid to venture upon new fields of enterprise. This may be true to a certain extent, but from the nature of our occupation it is necessary that we should count the cost before making any very wide departure from established usages. Certain general principles have become so well established that the average agriculturist is satisfied to adhere to these principles and abide by the result. A large majority of us are not seeking after new truths but are doing our best to provide the necessary dollars and cents to keep our machinery in running order. Indeed this question of dollars and cents is getting down so fine that whether we are willing or not it forces itself upon us at the end of the year, and should we be so fortunate as to have a few cents left, it shows that we have put in our time to good advantage. Our profits depend largely on the use we make of our time, in the amount of paying work we have done. As the little items in our cash account foot up an unexpectedly large amount at the end of the year, so we would be surprised at the number of days and half-days spent in work that has not paid. Our success or failure depends largely on this point.

Now the question comes up, can we find anything for experiments? If this

is decided in the affirmative, as I suppose it must be, as I said at the beginning much of our present advancement is due to experiments, the question arises, how shall we experiment?

I shall not touch upon the subject of scientific experiments, for scientific experiments of value take plenty of money, a long series of years, close and patient research. The person conducting them must have a truly scientific mind, must be able to collect all the truths in a series of observations and eliminate all the errors. Such experiments are for the discovery of new laws, —laws that form the sub-structure of all scientific agriculture.

But the experiments of which we are speaking are to teach us how to get the greatest returns for the labor we expend upon our soil. They are to teach us how to diminish the cost of production. Decreasing the cost of production is indeed one of the most important items in productive industry and must not be lost sight of. Such experiments can be made by any intelligent husbandman. Care must be taken, however, in all such investigations that the products of our toil do not cost us more than they will sell for in the markets. This would be poor economy.

To become good experimenters we must learn to be close observers. Any remarkable effect must be produced by some cause. Then the first question to ask is, can such an effect be repeated, and if so, what cause or what combination of causes produced it. By following up such observations and tracing effects back to their causes we should learn much in regard to the relative value of fertilizers and different modes of culture, and thus be enabled to improve our practice in many ways.

Much of the improvement made in our domestic animals has been by close observation in regard to certain causes producing certain effects, and these causes coming in the first place from experiments in crossing the different breeds or families.

The experiment is now being tried of crossing our common working-horse with the Percheron for the purpose of making them heavier and more compact. Time will tell whether the experiment will be of value. In such experiments good judgment and good common sense are necessary.

Experiments in feeding swine, sheep, and cattle are constantly being made that are of no practical use to anybody, save, perhaps, to the persons making them, for no record is kept of the methods pursued or the facts brought out. Such experiments have been made again and again and the results recorded. It is time and labor saved to learn what has already been done in the way of any experiment we may propose to undertake. Much good may come from testing new varieties of fruit and vegetables. We should never be afraid to give the new things a trial because they are new. It will take but little time and be but a slight expense to devote a small part of our gardens, orchards, and fields to the trial of new varieties of fruits, vegetables, and grains that promise to be of value. Experiments in the use of fertilizers can be made without any great outlay of time and money. If for four dollars we can buy a commercial fertilizer that will give us as great an increase yield of wheat per acre as eight dollars' worth of barnyard manure, then it will pay to use the commercial fertilizer and increase our area of wheat.

Every departure from customary usage is in a certain sense an experiment and must be taken with caution. There are many expedients that may be tried by way of experiment that may diminish the cost of production—such as sub-soiling, draining, fall plowing, using jointer, plowing with three horses instead

of two, selecting seeds, crossing the different kinds of corn, crossing the different breeds of sheep, swine, and poultry, always with a definite object in view, using labor-saving machinery. These are a few of the expedients that each can try for himself, always observing carefully the effects, and making a record of the same.

In conclusion, then, I would say that to succeed in making valuable experiments we must first count the cost, we must be close and accurate observers, we must have a definite end in view, and we must be willing to accept the logical answer that results from the facts brought out.

II. G. Reynolds, Grand Traverse, remarked as follows: In discussing the methods and objects of experimental study, it is very common to draw a wide distinction between the efforts of scientific workers and those of practical men.

This distinction, in so far as it refers to the objects sought, may exist to a certain extent in the minds of the experimenters; the theorist looking but for simple knowledge, the practitioner on the other hand anxious only for the benefits to be gathered from that knowledge.

But in methods of research the two classes have but one common road. No royal way is open to either. The student may undertake to solve more intricate questions, or those requiring greater precision in weights and measures than the other, but this is merely a matter of degree, and in whatever question the practical man does attempt an answer, his methods, to be effective, must be scientific.

About the terms "Science" and "Scientific" there is thrown a halo of mystery very similar to that which envelopes the words finance and financial. If we would but remember that finance is simply the study of money, and that science is nothing more nor less than the sum of known truth, we would save ourselves much trouble.

Science is our working capital of truths in possession, and scientific experiment is an honest and careful seeking for further truths in the light of those already known. If we neglect this light we must not wonder when we mistake brass for gold or the mirage for reality.

Without this light we cannot see but that the mine which we are laboriously working has already yielded its treasures. Science not only shows us where this treasure is, but it arms us with tools to dig it out, and with the refiner's blast and the assayer's crucible for separating and testing our results. The practical experimenter who ignores science is like the miner who should go naked and with bare hands to wring treasure from the earth.

Thus we see that a non-scientific experiment is properly one that is made to discover something already known, or something not worth knowing, or whose method is so defective that it proves nothing. All other experiments are scientific whether made by a school man or not.

But as before said, a distinction is sometimes drawn as to the object sought; the one desiring knowledge for its own sake, the other knowledge to use. But even this distinction exists rather in the design than in the result. For truth is one. It is a symmetrical and consistent whole, of which all the parts are so inter-dependent and interlinked that if we could but grasp and hold in our mind's eye the entire range even of known truth, any addition to this known truth, from whatever source, would be found to have its appropriate place in the general scheme, exactly as each screw and plate and tube of a vast engine has its particular place and is essential to the completeness, perfection, and availability of the whole.

To a Humboldt or a Newton we may imagine that any new fact, however seemingly trifling, would thus be seen to have its bearing upon what was known before, and would, like each new piece fitted to its place in a dissected map, help to gather up and show the connection between things that had heretofore seemingly had no meaning and hence no use.

So whatever the mental incentive to experiment, the proximate object in view and the methods used must be the same with theorist and practitioner. If then we are going to experiment let us recognize the fact that we are co-workers with scientists throughout the world, and thus will we see that our first move should be to find out who are working the same vein as ourselves, in order that we may be able mutually to help instead of impeding one another.

Thanks to the wisdom of our government, we in this State need not look far to find men of science whose efforts are specially directed to our own field of inquiry. The endowment of our State Agricultural College was for the express purpose of advancing both the science and the art of agriculture in all its branches. These objects it is attempting to accomplish by the education of farmers' sons, and by the original study and experiments of its professors.

But many persons, and even some farmers, while approving these objects, do not believe that the College is accomplishing them, and therefore propose to lighten our taxes by refusing the meagre appropriations asked for. They are like the Egyptian task-masters who said to the toiling Hebrews: "Ye are idle, ye are idle, no straw shall be given you, yet shall ye deliver the tale of bricks." Their opposition is based upon a wholly inadequate appreciation of the difficulties and magnitude of the work to be done. They imagine that it is only needful to give nature the cue in order to have her pour out her secrets to the inquirer, whereas nature is chary of her real treasures, and yields them only as they are wrung from her.

In no way will we appreciate better the difficulties to be encountered than by making common cause with this institution, and by trying ourselves to help her accomplish a little of that which we ask of her. Then will we learn that experimenting is hard work with small pay. Rome was not built in a day, and one fact will not establish a theory, unless indeed that fact be as the capstone to a whole pyramid of previous facts, all leading up to the same conclusion.

We have a great many so-called experiments much like the familiar one of the quack doctor who, having seen a German recover and a Frenchman die under a diet of sauerkrant and bologna sausage, entered those articles of food on his note book as a specific cure for all Teutons, but deadly poison to all Gauls.

That editors may be as easily convinced as was the doctor is shown by the following paragraph cut from a late paper:

"Berkshire vs. Poland China.—A very good test of the relative merits of these breeds was that made by Mr. —. At the same time he penned and commenced to fatten one hog of each breed. They were the same age and subjected to the same treatment. On Monday last both were weighed upon the city scales. The Berkshire weighed 885 lbs., and the Poland China 784 lbs. The merits of the two breeds have long been in dispute, and we think this test of their fattening qualities a very fair one."

If for Berkshire and Poland China we substitute German and Frenchman, for the same pig feed in the one case substitute sauerkrant and sausage for both men, and for the resulting 885 lbs., and 784 lbs., substitute recovery and death

respectively, we will have, except as to the age of the patients, the doctor's experiment exactly.

What was proved about the pigs? That Berkshires fatten better than Poland Chinas? No more than the German's recovery proved sauerkraut to be a balm for all his countrymen. It did prove that sometimes an individual Berkshire may do better than an individual Poland China, and if no other comparison had ever been made it would leave the presumption in favor of supposing that Berkshires would generally do better than Poland Chinas. To establish this conclusion it would be necessary in the first place to compare many pigs together to be sure that the result was not due to individual peculiarities; secondly the experiment would need to be repeated in many varying places and climates to be sure that our results were not true of one place only; and finally we would need to try it with various kinds of food and styles of treatment before we could really be certain that as a general fact, equally true of all places and circumstances, Berkshires do better, with the same opportunities, than Poland Chinas.

Instances of such superficial experiment could be multiplied to any extent.

I know of one case, a trial between two steers, where within a few days one gained fifty pounds on the other, but on inquiry it was found that the heavier animal had swallowed two pailfuls of water just before weighing!

In another trial, an animal which failed to gain much weight was found to have been teased every day by some small boys.

Thus it will be seen that to prove any general statement by experiment is no easy matter. Indeed, few have the time or means to make a really complete test of any question. And yet we may, every one of us, do good work in experimenting.

To this end we will need to remember that good work does not mean great work, and we will have to learn to be content with seemingly very small results. The prime rule always to keep in mind is this: Make sure of every step. Leave no possible loop-hole for error, and after all is done be sure to announce exactly what has been proved and no more. By practice of this kind our work will gradually come to be recognized by competent critics as of substantial value, and we will have prepared ourselves to be acceptable recruits in the volunteer corps of skilled experimenters which science and our profession so sadly need.

Prof. Tracy spoke of the importance to the horticulturists of the State of a discussion upon this topic, and hoped, inasmuch as the late hour prevented a more extended deliberation in this direction, that it would be continued in future meetings.

S. L. Fuller said he was glad and sorry for some things he had learned; he was sorry because there were so many difficulties in the way of successful experimenting; he was glad that our Agricultural College boys had been nudged in the ribs as to what they ought to do; not but that they were at work well, but he wished to see a continuance of excellent labor in just the direction indicated. The University and the Agricultural College would soon rule the State through those who were going out from these institutions, and he wanted the boys to appreciate what was to be expected of them as men. He felt proud of the good work done at these State institutions of learning, and wanted to see them liberally supported for the sake of the good that was coming out of them.

Prof. Beal.—To me, the papers and discussions presented on experiments, including the paper of Professor Tracy on Progress in Horticulture, have been exceedingly interesting. Good experiments on many points are still desirable, but the more familiar any man becomes with what has already been done in horticulture, the less he will be inclined to expect any startling results. There is scarcely a probability that there will be any discovery made which shall revolutionize horticulture, and thus enable men to accumulate wealth with much greater ease and certainty.

To aid in experimenting, a scientific training is valuable. We are all too much prone to square everything to some one rule, or set of rules. For example, if Mr. Bailey, of South Haven, finds out the best way to treat his apple orchard, or if I find out the best way to treat apple trees on the College farm, it does not necessarily accomplish the work for every farm in the State. So with a large number of topics which could be mentioned. Every expert farmer must not be guided by inflexible rules in all cases, yet he should have plans and try to work by them. We may occasionally get some better varieties of fruits, we may learn how to keep them better, and so with vegetables. The past year I have begun some experiments in breeding wheat, corn, beans, apples, strawberries, etc., in accordance with the valuable suggestions given by Mr. Darwin, in his recent book on "*Cross and Self-Fertilization of Plants*." In all my reading, I have not seen a book which contains so many hints on improving or obtaining new varieties as the one mentioned. As it is probably new to most of our members, I venture to give you my recent review of the book. I can contribute nothing on this subject which I think so valuable as this review, which was prepared for the Scientific Farmer.

[The review will be found in the Secretary's portfolio under the head "Darwin's New Book."—SEC'Y.]

The Society adjourned until Thursday morning, 9 o'clock.

Thursday's Session.

The meeting was called to order by the President, and the resignation of Mr. S. L. Fuller, the newly elected treasurer, was received, and, after some discussion, in which Mr. Fuller said he was not willing to take the office and do half work, as he would be compelled to do if he accepted it, the resignation was accepted, and Mr. S. M. Pearsall, of Grand Rapids, unanimously elected to fill vacancy.

REPORTS OF COMMITTEES.

The Committee on Nomenclature reported as follows:

Your committee has had placed before it for name, of unnamed sorts, six varieties; one plate of which had three different varieties; a single plate of only three apples had only one of a sort—the New York Spy, Long Pearmain, and Baldwin; one plate of Ramsdell Sweet, and one plate of apples for which no name was found, and which has since been revealed to us from the exhibitor to be a seedling apple from Gaines township, Kent county. It is of a fine, warm yellow color, quite oblate in form, of flavor almost sweet, and will be pronounced by some a sweet apple. Also another plate which we find to be Blenheim pippins.

C. N. MERRIMAN,
E. BUELL,
N. CHILSON.

Mr. R. Haigh, of South Haven, from the Committee on Flowers, read the report of that committee, the other members of which were George Taylor, of Kalamazoo, and Mrs. H. B. Chapman, of Hillsdale. The report says:

The largest and most varied collection was from the Valley City greenhouses of the late John Suttle, consisting of two fine specimens of Palms, an Alocasia, an Aspidistra: two ferns, and several varieties of foliage and other plants; also a neat Wardian case well filled with a suitable assortment of plants.

Messrs. J. Sharp & Son exhibited eleven specimens of well known plants, among which were a few fine ferns, a very handsome and symmetrical Lycopodium, two Begonias, two Chinese Primroses, two Centaurias; and their ferns were especially fine specimens.

Mr. Wm. Rowe had on exhibition a very beautiful variegated Scotch ivy, a peppermint geranium, a specimen of *Agone Zebrina*, a *Salvia*, and two beautiful hanging baskets.

The Committee on Fruit, through their chairman, reported upon the fruit exhibited at the meeting.

There were in all about 250 platters of apples of distinct and separate varieties, besides a large exhibit of pears and grapes. The addition which was made to the exhibit by over 50 plates of new and excellent varieties by I. E. Ilgenfritz, of Monroe, was conceded by all present to be of surprising attractiveness and beauty, and outranked every former December exhibition in the State. The following were among the exhibits in the apple department:

I. H. Morton, Grand Rapids, 5 plates.

E. Graham, Grand Rapids, 19 plates.

Wm. Rowe, Grand Rapids, 12 plates, and 3 plates of Crabs.

E. L. Briggs, Grand Rapids, 3 plates.

G. F. Elliot, 21 varieties.

P. H. Felker, 5 varieties.

Munson Brothers, 21 varieties, embracing one very fine plate of Wagener.

W. O. Houghtaling, 3 plates.

W. K. Emmons, of Wyoming, 14 plates, all very fine and of desirable variety.

P. D. Sneathen, Ionia county, 5 plates, including one of Red Canada and Golden Russet, of 1876.

Henry Holt, of Cascade, 7 plates.

Judge Ramsdell, Traverse City, 3 plates of Rhode Island Greening, showing the high color of that section.

L. H. Bailey, of South Haven, 14 plates, among which were the Stark and Swaar.

J. W. Humphrey, Plymouth, 8 varieties.

B. G. Buell, Little Prairie Ronde, 1 plate Red Canada and 1 plate of Jonathan, both of very fine qualities.

E. J. Shirts, of Shelby, 8 plates and 1 seedling of superior quality.

Reynolds, Lewis & Co., of Monroe, 15 plates, embracing Hawthornden and other rare varieties.

A. W. Blain, of Gaines, 23 plates.

R. F. Judd, of Parma, shows samples of the Oakland county Seek-no-further.

PEARS.

H. B. Chapman, Reading, 5 plates of pears, including the Lodge Pear and Winter Nélis.

E. Graham, Grand Rapids, 1 very fine plate Vicar of Winkfield.

A. G. Gulley, South Haven, 1 plate Vicar.

D. C. Loveday, South Haven, 1 plate for name.

S. W. Lull, South Haven, 1 plate Glout Moreceau.

Mrs. Sarah Smith, of Walker, 1 plate Lawrence.

Reynolds, Lewis & Co., Monroe, 4 plates Beurré Clairgeau, Duchesse, Beurré d'Anjou, and Doyenné du Cornice.

I. E. Ilgenfritz & Sons, Monroe, 5 plates, including Vicar, Lawrence, and others.

A specimen of California pear was exhibited by E. Buell, of Kalamazoo.

GRAPES, ETC.

E. Bradfield, of Ada, had on exhibition several plates of Iona and 1 of Eu-melan.

C. F. Goodhue, of Owosso, 2 plates Owosso.

N. E. Smith, Ionia, 1 plate Kalamazoo and 1 of Iona.

A. G. Gulley, South Haven, 1 plate Clinton.

A. W. Blain, Gaines, shows several varieties of plums, peaches, and currants canned, but the process is not described; also, 1 specimen of cucumber pickle, which is a curiosity.

A sample of cranberries referred to in the paper before the Society from St. Joseph, from a crop gathered at the rate of 450 bushels to the acre, was on view.

Mr. E. Buell, of Kalamazoo, in addition to other fruit shown by him, placed on exhibition a pear of the Duchesse d'Angouleme variety, which the committee remarks: "We may safely say is superior to anything of the kind ever shown at any of the former meetings of this society. It was grown by Hon. J. B. Johnson, of Nevada City. The weight of this pear is two pounds and five ounces."

A very excellent seedling apple was exhibited by A. F. Gaylord, of Eaton Rapids, which was pronounced delicious by all who tested it. Mr. Gaylord calls it his iron-clad seedling.

The following communication was sent in by Mr. C. F. Goodhue, with his samples of Owosso grapes:

"The Owosso grape is a chance seedling. We think it was from the Catawba. We did not know what it was until it bore fruit, and in fact did not then. We sent some of the fruit to the best judges of grapes we knew of at that time, and it was pronounced unknown, but an excellent grape. One said, 'I cannot place it, but is the best grape I have ever seen grow out from under glass.' It may be said that it is almost, if not quite identical with the Salem. We know that it is not the Salem, although the fruit resembles it very much; as for that, it has been most thoroughly tested by good judges. We have the Salem growing side by side of the Owosso. We find the berry very much like it, but nothing like it in any other respect. The taste of the skin of the Salem is quite different from the Owosso. The Salem is a few days earlier than the Owosso, the vine is quite tender, while that of the Owosso is very hardy, more so than the Concord, and a bountiful bearer. We have not failed of a good crop in seven years. The Salem is liable to mildew; we have never seen anything of the kind with the Owosso."

A. G. GULLEY,
J. N. STEARNS,

Mr. S. W. Fowler was called upon and made the following remarks upon

THE MANISTEE FRUIT REGION.

I have resided at Manistee nearly ten years, and during that time I have watched the development of the fruit interests carefully, and I have the satisfaction of *knowing* that, with proper care, fruit culture has proved eminently successful.

It is true that several large orchards have been planted in this vicinity that have proved perfect failures, and probably hundreds, if not thousands, of dollars have been wasted in such investments, and were it not that large and flourishing orchards on similar soil in the same neighborhood prove abundantly profitable to their owners under proper cultivation, the failures mentioned might seem discouraging.

Experience proves that it would be better to throw away money than to invest it in trees and waste time in planting, if they are to be treated with total neglect afterward. Manure and cultivation are as essential to fruit as to vegetables, and weeds and grass will choke out the one as readily as the other, until the trees have attained growth and power to resist their encroachments. Crops can be raised between the trees sufficient to amply compensate for the cultivation of the ground, and grass and weeds should be kept away from young trees as carefully as from growing vegetables.

I am aware that experiments at the Agricultural College are claimed as demonstrating that with old trees, spading around the trunk in meadow land is of but little avail, and this is probably true where the cultivation does not reach far enough to benefit the small fibers at the end of the roots, as but little nutriment is gathered by the large roots of old trees near the trunk. But I do claim that spading or mulching in meadow land around young trees is not only beneficial, but essential, and that if they extend far enough with old trees to reach the small fibers at the extremity of the roots it would prove very beneficial. I have made an experiment by planting fifty trees, including plums, apples, pears, chestnut, walnut and butternut in grass sod on heavy clay soil, spading first, three feet square, and I have spaded about three feet from the tree each way once or twice a year since, and mulched with a wheelbarrow load of barnyard manure each fall and spring. By the side of these trees, in the same lot, I have planted others on plowed ground that were purchased at the same time, and as nearly as possible like them, and this ground has been kept thoroughly tilled, and the trees have been mulched the same as the others. They were planted five years ago last spring, and the trees in the grass will average larger at the present time than those on tilled ground, although all of them have made a wonderful growth, some of the plum trees being now 10½ inches in circumference two feet from the ground; and most of them were loaded almost to breaking with fruit this season. It was from these trees that I took the plums which received the first premium at the State Fair. This experiment proves that by mulching and cultivation trees may be grown on grass land. The peach and apple trees have also commenced bearing. I attach great importance to fall cultivation and mulching. Fall plowing and spading accomplish two objects of great importance, not attained by cultivation in the spring: It enables the frost to pulverize the soil, and destroy the insects and larvae that otherwise might flourish to eat out the life of the tree, and it leaves the ground in much better condition to feed the tree during the following season. Fall mulching protects the roots from extreme cold and enables the earth

to absorb its richness and be ready to feed the fibers in early spring. So much for theory.

Fruit culture pays well in this region.

1. Land is cheap, making the first necessary investment small. Good fruit land can be obtained at from \$10 to \$20 per acre, near market, and steamers leave this city for Milwaukee, Chicago and most of the lake ports, every day.

2. The curenlio does not trouble plums, and fruit generally is free from insects that prove such a pest in other localities.

3. The risk of blight from extreme cold is less along the east shore of Lake Michigan than in many other places. The mercury seldom touches zero, and never reaches much below, while in times of extreme cold it is always from ten to twenty degrees warmer here than in Milwaukee, Chicago, or in the middle and eastern portions of Michigan. The depth of the lake prevents freezing, while the warmth of its waters retards frost in the fall, and reversing the process, its cold waters retard fruit buds and protect them from early frosts in the spring, and the prevailing winds being from the west and southwest, this shore has the full benefit of this vast weather regulator.

The Riden plum orchard in this city, covering about two acres of land, yields from \$400 to \$500 worth of plums annually, and a man living a few miles north of this city informs me that he sold the plums in Milwaukee that he gathered from one tree this season for \$36. While this may be an exception, it is true that the yield from an ordinary tree in ordinary seasons is sufficient to bring from \$5 to 15, while pears and other fruit do well. Peaches this year were sold in our streets from wagons until the demand was more than supplied, at \$1.25 per bushel, and this has been regarded as an off year for peaches and apples. Manistee probably beats the world on strawberries and other small fruits. The yield is believed to be larger and the quality unsurpassed. Out of the many examples of great success in small fruit culture, that have come under our immediate observation, we will crave space for only two or three. S. Rice, of Bear Lake, in Manistee county, cultivates less than an acre, on gravelly loam soil, of strawberries. From this small patch, this year during the picking season, he marketed a two-horse wagon load each day. During the season he sold 100 bushels at an average of over ten cents per quart, or \$320 for the product of a single acre in one season. On the other hand, Chas. Hurd, Esq., of this city, cultivated two acres of strawberries, with several acres of other small fruits. This soil is as light sand as any in this vicinity, and he used a windmill for irrigating purposes and gave his fruits careful attention. From the two acres he marketed 202 bushels, with a return of over \$640. He also sold fifty bushels of raspberries, and a large amount of other small fruits.

The fruit farm of Filer & Sons is less profitable, and several others have done about as well, though in a smaller way.

The culture of grapes in the vicinity is only beginning to attract attention. Many fine grapes have been raised and the vines generally look well. Chas. Reitz & Co., have nearly two acres in grapes which are just beginning to bear, and the vines appear promising.

Mr. H. Dale Adams, of Galesburg, followed with a short paper entitled

MY FLOWER GARDEN.

There is no secrecy about it, but success is only attained by strictly observing some certain indispensable rules, or, if you please, there are some that must be attended to or failures will be the result.

First, a thorough preparation of the ground must be given. It should be rich, made thoroughly so, by well rotted or well composted manures. The ground should be well worked to a liberal depth, not less than eighteen inches to two feet—barn yard manures, if well rotted, are the best. The depth of soil is necessary to carry you through a drouth which is sure to occur sometime during the growing or flowering season, and, even then, many of our finest blooming plants will suffer and amount to but little without watering copiously at such times.

My own flower-garden was of no greater extent than eight square rods, yet there was hardly a time from the blooming of the peonies in May until late in October that less than a bushel basket full of flowers could have been cut at any time, and many of the hardy perennials, like pansies, feverfew, etc., have afforded us a liberal supply until this last freezing of the ground.

Many attempt too great a variety—taking too great care to give each sort the special treatment that particular variety demands, and so fail by attempting too much in this direction.

Bulbous plants, the crocus, hyacinth, and tulip, are the first in season and last until peonies and roses come in to take their places. The former, if in the open ground, should be planted in the autumn, and present the best effect in masses each kind by itself, in circular or geometrical shaped beds, cut from the grassy lawn. The coloring is greatly intensified and the effect is surprisingly more beautiful by the green of the surrounding grass. If an effect is desired to be kept up during the season with plats, as soon as the bulbs are out of flower, fill in with foliage plants, such as coleus, cineraria, maratima, etc., with some larger kind like calladium esculantum, canna indica or some robust growing geranium for a center piece.

If you have not already a supply of bulbs when planting time arrives, any seed store, or any of our commercial florists can supply you. Unless you are over-fastidious, and have more money than you can well take care of, buy mixed sorts—they are nearly as good on an average, and many of them superior to the high-priced named sorts, and you get ten times more for your money.

A little clean sand immediately around the bulbs of hyacinths and tulips often prevents rotting of the bulb.

Cover the beds with four or five inches of manure or leaves for winter protection, and no further attention is needed except to remove the covering in the spring.

The great varieties of Chinese peonies of late years have proved a great acquisition to our flowering plants.

I have been adding from year to year one or two to my collection as I have found the colors to please me, and have now twenty varieties, and I must say I have found few or no flowering plants that please me better for the care necessary than these.

If, from any cause, it is necessary to neglect any of your plants you can do it here. They ask few or no favors of you, but go right ahead, just the same.

Roses come next.

I used to think I got but little satisfaction from this class of flowering plants for the amount of labor and care I gave them. I usually, from the perpetual blooming class, got a fair show in June, and occasionally a poor misshapen one would appear half smothered by a cluster of sickly, abortive buds, as if it were ashamed to be seen, and this was all, unless we take in consideration an ugly mass of briars or thorns, everywhere a nuisance. They have behaved some-

what better since I turned the cold shoulder to them and left them with scantier diet. They have made less growth of wood, but have given quadruple the amount of bloom.

The present season has, however, been an exception; there was a wonderful bloom in June, after which, owing to the favorable season for growth of wood, they did but poorly.

I was led to believe that high culture and very rich soil were not the best for blooming roses, from seeing often the finest bloom in nursery rows where the plants were crowded and getting no better care than other nursery stock, many of which I saw on the grounds of the Lake Shore Nursery Association at South Haven during our last June meeting.

THE ANNUALS.

Let us now look among the annuals and see if we can find anything worthy of our attention. There is the *Balsam* and the *Petunia*, and the *Cockscomb*, and the *Zinnia*, which I have often been tempted to kick out of my little Eden, but couldn't find just the thing to take its place; and the *Portulacca*, now grown of every color, from pure white to deepest crimson; and *Phlox Drummondii*, *Sweet Alyssum*, *Asters*, *Ten Weeks Stock*, *Pansies*, *Dianthus*, and *Snapdragon*. There are many more, but here are nearly enough; one climber, *Maurandya*. All these grew nearly to my satisfaction. Of *Petunias* I had 16 plants—single and double—as good as I had ever seen, on an average 10 of which were equal to any 10 of the best prize sorts. One package of mixed pansy seed gave me a great variety of fine ones, four of which are equal to the best. Of these the King of Blacks and Baron Rothschilds were all true; Cock's-combs of all colors, size of largest 6x16 inches, and of these the new Japan is a great acquisition.

I grew many other kinds of flowering plants than those mentioned, but you know I am an amateur. Enough have been mentioned to satisfy most any one if they are given the proper attention. But one wants to know "how you did it,"—"where you got your seed, and all about it." Nearly all my plants were started in a small hot-bed in March, and as soon as large enough to transplant they were potted in two and three inch pots and kept under glass until all danger of frost had passed and then planted in the open ground.

THE GROWING VEGETABLES.

The question of how shall farmers and fruit growers raise an abundant supply of seasonable vegetables for all seasons of the year, was to be discussed at this meeting, but for lack of time only a few remarks were made by Prof. Beal as follows:

In the first place we must teach the farmers the value of a liberal supply of good vegetables in the season when they are ripe. After this comes the subject of keeping vegetables properly and of raising a succession. Already most people know what it is to have a good supply of good potatoes. In season, or for a short time in each year, almost everybody raises tomatoes, and lettuce, and sweet corn, and peas, and beets and onions. Very few people undertake a hot-bed. There is something delicate and mysterious about it. A hot-bed is not hard to learn about. By its use lettuce and radishes can be had some weeks earlier than when raised in the open air. It is convenient for starting tomato plants early; also early cabbages and cucumbers. Beets, turnips and

late cabbages, are often started too early, and get tough or overgrown by winter, and in case of cabbage will not keep well. Some people make use of artichokes. They make a variety. A few early carrots are often relished, and parsneps are still more desirable. Most roots and vegetables can be preserved by burying them properly in the ground. Do not cover warm too early. The difficulty of burying is great in our variable climate. In cellars, artichokes, beets, turnips, parsneps, carrots, vegetable oysters, and winter radishes, are best kept in boxes with damp sphagnum. In case sphagnum is not handy, use damp soil. In autumn I have seen beets a year old kept in sphagnum. They looked as fresh as the new crop, and were nearly as good.

Parsneps and salsify keep longer than usually supposed, if buried in a shady place, and left undisturbed till some time late in May. They may be kept in an ice-house late into the summer. For corn, more pains may be taken for a succession. So with lettuce and radishes and peas; until people become accustomed to their use, they do not know the value of salsify, or vegetable oysters. No family should think of doing without a few roots of rhubarb and a bed of asparagus. A few rapidly grown turnips, or bagas, kept in sphagnum, are a luxury. Sweet potatoes are not very fine when grown in our climate, but these, or others bought farther south, may be kept a long time, if properly attended to. They must be well ripened, and carefully dried and placed by a stove till the skin becomes well dried, when they may be placed, without any packing, in a tight box or barrel, and kept at a temperature of about 60°. Some people like summer squashes which are early raised, and everyone should have late squashes occasionally from summer till spring. The Hubbard, Marblehead, or winter crookneck, to keep well, should be very tenderly handled, not even shaken or turned over. Place them at the first approach of light frost under a shed, and cover with litter till there is danger from freezing, then carry to a cool cellar. They ought to keep till spring. But the crowning vegetable of all is celery, and how rare to find it on our tables, especially in the country. At this time I will not write an essay on this important subject, but merely say that celery is wholesome, palatable, delicious; that it is worth the trouble of every man to learn how to grow it and to preserve it for winter use. A good supply of vegetables is necessary for comfort and for health. Like fruit, they are absolutely necessary for a good living. Fruit and vegetables are much cheaper than fish and flesh, and if well supplied with a good variety in all seasons, less meat would be eaten, and in my opinion we should all be the better for it.

The Committee on Resolutions reported through the chairman, J. G. Ramsdell, an appropriate series of resolutions, tendering thanks to all who had so effectually rendered service in making the annual meeting for 1877 a success.

Adjourned to meet in Allegan some time in February, exact date to be settled by the Executive Committee.

REPORTS OF LOCAL SOCIETIES.

GRAND RIVER VALLEY HORTICULTURAL SOCIETY.

OFFICERS.

President—William Rowe, Grand Rapids.

Vice President—A. S. White, Grand Rapids.

Secretary—W. N. Cook, Grand Rapids.

Treasurer—S. L. Fuller, Grand Rapids.

This Society held monthly meetings convening the first Tuesday afternoon in each month for the entire year; held a very successful fair in connection with the Kent County Agricultural Society, and entertained the State Pomological Society at the annual session of that organization.

The work of the Society is intended to cover the whole field of horticulture, although as yet pomology leads.

The April meeting was given up to plants and flowers, the question being "What are the ten best varieties of plants for window gardens."

Mr. John Suttle, being called on for his views, said it was rather a hard matter to answer the question. The following list, however, of plants for winter blooming he felt sure would be found as satisfactory as any ten that could be selected:

One rose geranium.

One heliotrope.

One calla.

Sweet alyssum.

Mignonette.

Two varieties Chinese primrose.

Two varieties of Bouvardias.

Two varieties of rose—one Hermosa pink, and the other Agrippina red.

Mr. Suttle said he had eleven instead of ten in the list, but that he would like also to squeeze in a variety of the Begonia. The English ivy was a very desirable plant in every way, but he had not included it in his list as it was not a bloomer, and he has confined his selections to winter-blooming plants. The Chinese primroses he considered, on the whole, the best winter-bloomers for ordinary house culture; they would bloom with less light than the rest. The Bouvardias were also fine bloomers, and would bear more dry heat than most others. The roses given in the list were very satisfactory, giving flowers freely during the winter months, but they needed a good light; in fact, the more

light the better for all the plants, but these same varieties would bloom in a dimmer light than those others. Azaleas would also be found very fine bloomers for March and April, and a good plant would continue in bloom for two months. In reply to a question as to fuchsias, Mr. Suttle said these were of course very fine for spring, summer, and fall blooming, but as they were not winter bloomers, he gave them no place on his list.

Mr. Rowe said he thought the question was not by its terms confined to winter flowers, or plants for winter culture. The question was as to the "ten best varieties of plants for window gardening," and there were many persons in Grand Rapids, as in other cities, whose floriculture was limited to the window garden both summer and winter. It was perhaps just as well, though, to limit the discussion to winter plants at this time, as that topic was seasonable. Mr. Rowe mentioned the common morning glory as blooming well in the window garden in the winter; also the pansy; likewise the sweet alyssum and feverfew.

Mr. Suttle said the pansy would not stand the dry heat, and he thought it would be difficult to succeed with in living rooms. The colder the pansy was kept the better, so long as it did not freeze.

The question being asked if calla lilies would do well in the window garden in the same heat as the other plants, Mrs. Immen replied that her experience was to the contrary. She could never succeed in that way, either by setting the calla in the box free, or by potting it and then setting it in the box of earth. It needed more water than could be given to it without damage to the other plants. And this was the general verdict.

In response to a question, Mr. Suttle stated that 60 to 65 degrees was as high a temperature as was good for most greenhouse plants in the winter: he aimed to keep his greenhouse at from 50 to 60 degrees. The great difficulty in keeping plants in living rooms was that the temperature was kept too high and the air too dry. A pan of water ought to be kept on the stove so as to keep the air moist by evaporation. Plants would stand much more heat if the air was thus kept moist. Plants needed all the light and sun in the winter that could be given them, but care should be taken not to give them too much water.

ADRIAN HORTICULTURAL SOCIETY.

OFFICERS.

President—Peter Collar.

Vice President—Calvin Crane.

Secretary—Woodland Owen.

Treasurer—Artemus Sigler.

Librarian—Henry E. Owen.

Executive Committee—James Holmes, C. W. Sheffield, Jesse Warren, Benjamin Steere, J. Randall, D. Ellenwood.

This Society has a library of upwards of two hundred volumes, and takes for the use of its members eight of the leading agricultural and horticultural periodicals. The meetings are designed to be held monthly, but during the year have not been attended with regularity. The February meeting was a very interesting one. The subject discussed was, "What are the six best varieties of pears for profitable cultivation in this locality?" The discussion took a wide range on pear culture, and the subject of blight entered largely into the making up of lists of varieties. Three lists were presented, one each by James Holmes, Artemus Sigler, and Dr. Owen. While some difference is apparent in the lists presented from the large number of good pears in cultivation, yet they all agree on the leading varieties. Mr. Holmes' list for 100 trees is, 10 Beurré Giffard, 50 Bartletts, 10 Flemish Beauty, 10 Seckel, 10 Beurré d'Anjou, 10 Winter Nélis. Mr. Sigler presented a list with 5 Dearborn Seedling, 50 Bartletts, 20 Flemish Beauty, 10 Sheldon, 5 Seckel, 10 Beurré d'Anjou. Dr. Owen presented a list of 100 trees, with 2 Tyson, 63 Bartletts, 15 Flemish Beauties, 10 Beurré d'Anjou, 5 Lammas, 5 Beurré d'Arenburg. Considerable exception was generally taken to the Beurré d'Arenburg in Dr. Owen's list, and it elicited considerable discussion. And the doctor stated that he had but one tree about sixteen years old; that it has borne from three to four bushels of pears on an average each year for five successive years; that they are of good flavor, rather tart, and are in prime condition at New Year's, and sell in this market readily for \$2.50 to \$3.00 per bushel, and keep as easily as potatoes. The tree grows in a gravelly soil with occasional strata of clay, and has never shown any symptoms of blight.

At the March meeting, the subject for discussion was, "What is the best method of pear tree culture from the time the tree is taken from the nursery till fruiting is fully established?" Mr. Sigler said his experience had been principally with dwarf trees, but had grown some standards. Usually, the dwarfs had been a failure with him, but his standard trees had grown well and produced heavy crops of fruit, with high fertilization and heavy mulching, but lately the trees show a disposition to blight.

Mr. Holmes attributed blight entirely to atmospheric influence, and thinks it makes no difference whether trees are highly cultivated and manured, or whether they stand in sod or cultivated ground. His trees have blighted about the same in either method of culture. Soil, clay, well under-drained.

Mr. Peter Collar has had considerable experience in the cultivation of trees of the various kinds. Thinks a too rapid growth, caused by stimulating manures, is detrimental to the health of the tree. He would grow pear trees

as he would corn, and if they show feeble growth would apply stimulating fertilizers with good cultivation.

A paper was read by Dr. Owen as follows, on

PEAR TREE CULTURE.

In this paper I do not intend to go to the nursery and tell how the trees are to be grown, or any for the orchard; neither do I intend to discuss the subject of preparing the ground for the young orchard; but presuming that the ground intended for it has been well located, well drained if needed, thoroughly cultivated, and of sufficient fertility to produce a first-rate crop of corn, that the trees have been well grown, and at this point I see that they are well planted, and of correct distances apart, and with all this well done, it is a fact standing out prominent in fruit culture, that the pear in most localities in the fruit-growing regions of the United States is one of the most uncertain in its pecuniary returns to the cultivator; not that good prices, and even large prices, are not obtained for good fruit, but the difficulty is, there seems to be no certainty that a pear orchard, if apparently well grown and thoroughly established, will not in almost a single season be destroyed by the blight, a disease which has thus far baffled the skill of the best cultivators to remedy. The subject before us is the best method of "Pear Tree Culture," that method which is best adapted to produce trees which will make a good thrifty growth, and be exempt as much as possible from the destructive blight. Various theories have been advocated by cultivators for many years, but no certain remedy has been discovered to grow trees which will certainly resist this evil. But hundreds of orchards and tens of thousands of trees, which a few years ago gave promise of pleasure and profit to their owners, are amongst the things hoped for but not realized. The question at once arises: "What is the cause,—why should an apparently healthy and thrifty tree be suddenly struck as with death, the limbs and leaves turning black, often when well loaded with fruit? There must be a cause, and I would suggest for the consideration of this meeting, if it may not be largely attributed to the too rapid growth, both in the nursery and in the orchard, caused by strong and stimulating fertilizers, to produce rapidly what nature requires more time to healthily produce,—forgetting the old adage "He that plants pears plants for his heirs." We don't wish so much to plant for our heirs as for the best market; so we stimulate growth, hoping to get in a few years what our ancestors waited nearly a lifetime to produce. My theory and practice is to give *good cultivation*, and but little manure and whatever manure is given is first applied as mulch, as wide as the roots of the tree extend, covering the ground both summer and winter that the equalization of the temperature about the roots may be more uniform and not subject to such sudden changes as are so frequently experienced in this climate. I would keep up as good cultivation as I would for a premium crop of corn, removing the mulch for the purpose and replacing it again as soon as the cultivator had done its work. I would follow this treatment until my trees were well established and commencing to fruit, when I would seed down and keep the orchard in grass. I would continue the system of mulching sufficiently to keep up the fertility of the soil,—which would at the same time keep the surface from becoming sod-bound. This mulch can be of almost any kind that will not heat or ferment, and may be judged of in some measure by the necessities of the soil, some needing such as will increase the fertility of the soil,

while grass, hay, straw, or most any rubbish will be all that others require. While this cultivation is given to the young trees other crops can be grown between the trees, such as potatoes or root crops, or even raspberries and other small fruits, returning sufficient to the cultivator to repay all expense and labor given them. If this cropping is pursued it must be understood that a greater draft is made upon the soil, and the cultivator's judgment must advise him that while it is not best to over-stimulate on the one hand, he must not starve them on the other.

At the May meeting, the subject discussed was, "Can Small Fruits be Profitably Raised for Market in this Locality?" Mr. Sigler and J. W. Helmes, have both raised small fruits for profit, and gave their experiences in various kinds. Mr. Sigler stated that $1\frac{1}{2}$ acres of blackcap raspberries had netted him an average of \$125.00 per year for 7 years, exclusive of the picking and marketing. The outlay was the use of the land and \$10.00 per year for cultivation, no fertilizers having been applied during the time, and thinks that with better care and culture the profits would have been greater. Mr. J. W. Helmes, a market gardener, had raised small fruits several years, but is not satisfied with the results. The dry summers often ruin the strawberries and severe winters the blackberries, making the average crop with him a poor remuneration. Several others gave their experience, and it was generally conceded that small fruits on proper soils, carefully cultivated and handled would give a good return to the grower. Several other meetings have been held during the year, without any special question for discussion, but have indicated a general interest in Horticulture, Pomology, and Floriculture.

LAKE SHORE POMOLOGICAL SOCIETY.

OFFICERS.

President—M. B. Williams, Douglas.

Vice Presidents—A. Hamilton, B. Markham, N. W. Lewis, J. Caithness, W. Corner, J. F. Taylor.

Secretary—Byron Markham, Sangatuck.

Treasurer—J. S. Owen, Douglas.

[This society has had monthly meetings, but none of the proceedings having been furnished beyond some resolutions of merely local interest, the account of work accomplished cannot be appended, as I would like.—SECRETARY.]

INGHAM COUNTY FARMERS' CLUB.

OFFICERS.

President—A. F. Wood, Mason.

Vice Presidents—James Fuller, John Gearhart, C. C. Marsh.

Recording Secretary—L. H. Ives, Mason.

Corresponding Secretary—A. M. Chapin, Mason.

Treasurer—D. C. Smith, Mason.

This society holds monthly meetings,—mostly at Mason, but occasionally at the Agricultural College or at the Chandler farm, and one meeting of 1877 was convened at the farm of J. N. Smith, in Bath. The proceedings are largely connected with farm topics and not appropriate to this volume, but occasionally a meeting is given up to Horticulture, and the following essay was given at one of these fruit meetings:

A PLEA FOR THE MORE EXTENSIVE CULTIVATION OF SMALL FRUITS.

BY W. ASA ROWE.

The farmer's home, of right, ought to be the happiest home in the land. Anything that will add to its attractions for the eye, lessen the burden of its occupants, or make their life pleasanter in any way, is worthy of discussion here.

That most of us may learn how we may better attain these objects than we now do, even with our present means, all will admit. The object of this brief paper is to urge the more universal cultivation of fruits, and then to lessen the labors of mother, wife, or sister, and give the whole household pleasure by furnishing at the door an abundance of small fruits, that are good to the taste as well as to the sight, and that injure not.

Strawberries, raspberries, blackberries, huckleberries, cranberries, gooseberries, and perhaps grapes, may be properly classed under the heading given this paper. When well ripened, they are all healthy for most people, and delicious articles of food.

Of their nutritive value, I have nothing to say. It is not great. Their value is as a dessert, and a harmless and pleasant treat to friends as well as self. Berries have their use, if they are not so good as bread and butter to feed a starving man. We all know their value, and appreciate it, when we have them on the table. In fact, some and perhaps most of us cultivate a small patch of strawberries, and permit a few desolate looking old currant bushes to grow in some vacant spot about the door. To most of us, however, a full supply of these various delicacies is unknown. Why this is I know not, unless it be because he who "was created lord and master of earth" makes money so fast by growing thirteen bushels of wheat per acre that he cannot look to such little things.

Certain it is that if a person starts right, and gives the subject the requisite attention at first, it will cost no more to cultivate one-half an acre of berries than to care for an acre of corn, and they will be worth double their cost to any family. If they are to be picked from the field (and they will be picked if they grow), the account would stand about like this:

Berries debtor: To time consumed in traveling several miles to and from the berry patch.

To dresses ruined by going through the thick brush in berry patch.

To wet feet and consequent colds, and doctor's bills.

To ill humor, caused by excessive fatigue and tramp.

You may fix your own value upon each of these items as low as your knowledge of the true circumstances will allow, and give due credit for the fruit obtained, and at the end of the season, unless you are more favorably situated than most of us, your fruit will be dearly bought, saying nothing of the interest on the value of land. One-half an acre planted properly to small fruits may be cultivated and cared for at a cost of not more than \$10 per year, and will yield from 300 to 500 quarts of fruit. This fruit is yours and can be picked after the dew is off. No wet feet, no torn dresses, no ill humor, no loss of time going two or three miles to the berry patch. The pail is full, the picker rested, and all goes on smoothly.

Of the cultivation and treatment of most of these fruits I will briefly speak. First, let me take up that most neglected of fruits, the grape. Of this fruit, Mr. Thomas, in the *American Fruit Culturist*, says:

"Within twenty years the grape will undoubtedly stand next to the apple among fruits. With care, and a proper selection of varieties, they may be placed upon the table from summer to spring."

For myself, who am busy most of the year with general farm work, I should plant one-sixth Hartford Prolific, one-half Concord, one-sixth Delaware, and the rest, perhaps, Iona, Rebecca, and Diana, the last for winter use. They may be planted and trained on buildings, fences, etc., but do the best in rows, trained on a trellis, and well cultivated. Plants are usually set eight by eight feet; but I have seen them doing fully as well, per acre, when in rows ten feet apart, and the plants twelve feet in the row. The best vineyard I ever saw, was planted twelve by eight feet, and every other one of these plants was to be taken out after three or four years.

For the grape a southern exposure is better here, as in those locations they start earlier in the spring, and the fruit ripens up much faster and earlier in the fall. The vines do best when laid on the ground during the winter. The soil should not be too rich, for they will run too much to vine, and not ripen their fruit. In pruning, the great object is to keep them within proper bounds, adapt them to our trellis, prevent their overbearing, and give the fruit plenty of light. This is secured by having one or two permanent canes confined to the lower part of the trellis, from which the bearing shoots are each year allowed to grow. These laterals are allowed to bear four or five bunches each; and to stop their excessive growth, and produce fine fruit, are pinched as soon as they have grown four or five leaves above the upper bunch. As the fruit is produced upon the new wood, the laterals are cut back each fall or spring, leaving only the bud nearest the permanent cane. This bud will, the next year, grow and bear the grapes.

STRAWBERRIES.

In raising this fruit, the cultivation may be varied somewhat with the kind raised: such kinds as the Jucunda, Downing, and *Agriculturist*, requiring much better cultivation than the Wilson or Kentucky. Of course the latter varieties will well repay good cultivation, and a constant trimming of the runners, but they may be partially neglected, and still give a fair quantity of

fruit; while the first named varieties, especially the Jucunda, must be carefully freed from all runners and weeds, or the consequence will be a very small quantity of fruit. We *may* care for the latter class, but *must* care for the former.

With those who have plenty of farm work to do, and little time for the garden, everything possible should be cultivated by horse-power. Strawberries are no exception to this rule. Plant them in rows three and one-half feet apart, and allow Wilson, Kentucky, and in fact, all except a few of the choicest, to run together in rows. Plant on clean ground; mulch in the spring if it has not been done the previous fall. If large weeds come up, pull by hand till after the fruit ripens, then go through with a horse cultivator frequently and thoroughly for the remainder of the season, and clip runners. Renew every three or four years.

Some practice the following, instead of renewing, namely: Plant as before, only after fruiting; allow space between each alternate row to become covered with young plants for the next year's bearing. After these fruit, the other space is to be covered with young vines, and these are to be cultivated up, and the space kept clean for one year, when it is to be manured and again covered with plants.

In this way beds of the Wilson have been kept in profitable bearing for twenty years. Mulch in the fall with long straw; chaff will smother the plants.

The white grub sometimes eats their roots. Do not plant on ground where they are. For most of us I think the Wilson is the kind to raise: it has no extra qualities, but will always do fairly.

On many soils the Kentucky does as well as the Wilson, and yields a better quality of fruit. I have never raised it.

With me, on a heavy soil, the Agriculturist has done very well and grown a very fine fruit.

If you can give time and attention to them, try Chas. Downing, Col. Wilder, or Jucunda. Where they succeed they give large berries of superior quality, but in quantity are not equal to Wilson under like treatment.

RASPBERRIES.

Of these there are two classes, the red and the black. Most people here prefer the latter, but if fresh and clean the red ones are, to my taste, much finer, being juicier and having more pulp and less seeds. Both classes require a good, rich soil. One containing much vegetable mould is best. A good place for them, especially the red class, is on a reclaimed swamp.

The red class increase by suckers. In some, as the Herstine, these are more numerous than in others, as the Clarke or Philadelphia. Plant these in rows six feet apart, and if you raise them yourselves and have plenty, put in every eighteen inches in the row. Allow them to run into rows, but between the rows these suckers are weeds and must be treated as such. Begin to cultivate early and keep the weeds down. The second year they will bear moderately, and after that a full crop. I have known them to bear 1,000 quarts per acre the second year. All the red raspberries are liable to be killed down by severe weather. This does not injure the roots, and new shoots will grow up and sometimes bear a small, late crop the same year. Many persons claim that it pays to cover them every fall with earth. This may be rapidly done by the use of a plow, setting the clevis so that a furrow may be thrown against the row to

turn the bushes down on, and thus prevent their breaking. A plantation of red raspberries is good for fifteen or twenty years, if properly manured and cared for. Philadelphia and Clarke succeed almost everywhere.

The black raspberries propagate themselves by the tips of the cane reaching the ground and rooting. These require more room than the former, and do much better when planted in hills. About eight by three feet makes a good distance. They must be fastened up by means of stakes. Allow only four or six canes to grow in a hill, and when these get five feet high, go over with a sharp corn-cutter and clip the ends to stop their growing higher. The Doolittle and Mammoth Cluster are first-class and hardy. The Yellow Antwerp belongs in the same class, but is tender. It may be planted for the color of the fruit. Both classes should have the old brush cut out in the spring, or it will interfere with the picking.

The blackberry is a badly neglected fruit, and should be cultivated by every householder. The fruit is fine and the plant productive. They should be planted well away from the fence so that they will not get into the fence corners. In the field, away from the fence, they are easily kept under control. They are propagated by suckers, and do best kept in hills six by six, or eight by four feet. Cut the canes back to two and one-half feet, and laterals to one and one-half feet, and they will give an immense crop of fine fruit, and will not destroy both hands and dress of the picker.

The Lawton or New Rochelle is good, also the Wilson, which ripens its fruit nearly all at once.

The Kittatinny I know nothing of. All are liable to winter-kill, but in this case they will sometimes give a small October crop. The Wilson is more vine-like, and may be quite well protected by dropping a lump of dirt on the canes to hold them down upon the ground.

THE COLDWATER HORTICULTURAL CLUB.

OFFICERS.

President—Judge Thompson.

Vice President—A. J. Aldrich.

Secretary—J. D. W. Fisk.

Treasurer—Hon. Harvey Haynes.

This club was organized December 23, 1876. Several preliminary meetings had been held and much discussion had respecting the best working plan and just what scope should be given the society,—whether it should be pomological or horticultural,—whether it had better be a town or county society. It finally decided that as a systematic study of horticulture, botanically and practically, was to be the object of the organization, it could best be accomplished by forming a local club, each member of which should be interested in the subject, and anxious to increase his horticultural knowledge. A brief constitution was adopted providing for the usual corps of officers, for regular meetings, and for semi-annual exhibitions.

The plan of proceeding in our meetings has been somewhat as follows: We take up some branch of horticulture, commencing at the foundation, and keep at work upon it till we go over all the ground. As for instance, in apple culture, at one meeting, our topic for discussion, was “the Soil and Location best Adapted to the Apple Orchard.” At the next, “the Trees, and How to Plant Them.” At the next, “the Culture and Pruning of the Orchard.” And finally finishing with the “Picking, Storing and Marketing.” We arrange for a botanical paper at each meeting. Our first was on “Seeds;” the next, “How Plants Grow;” the next, “the Circulation of the Sap;” then “Bud and Bloom;” then “Fertilization of the Flower,” and so on. After having adopted this general plan there is very little difficulty in arranging our work for each meeting. And by going through each branch of horticulture systematically, we get it much more thoroughly studied. We have now commenced the study of the garden. The first paper on this subject is herewith appended, also the paper on the “Circulation of the Sap,” and the entire proceedings of the April meeting.

APRIL MEETING.

The topic appointed for discussion was the “Gathering, Storing and Marketing of Apples.” The discussion was opened by Judge Warner. Mr. W. said the subject was one of great importance; there was little use in raising fruit if we do not harvest and market it. A common error in gathering winter apples was in deferring it too late. They should be picked two weeks earlier than the usual time. When the apples begin to fall they should be gathered immediately. Pick them carefully, place them in heaps and leave them for a few days to sweat and dry, then sort and barrel. A good deal of ignorance and iniquity has been practiced in packing for market. Large quantities had been brought to his mill to be made into cider that had been purchased for shipping. A few good apples had been placed at the ends of the barrels and the balance filled in with inferior fruit. Of course this was a miserable cheat

and could not be too strongly condemned. He said no better apples should be put at the ends than in the middle. A man who grows and packs much fruit should do it honestly, put his name on the barrels, and thus make a reputation for himself.

Mr. Selover said he had not usually packed his apples except for his own use, preferring to sell his fruit on the tree. This he should continue to do whenever he could get a good price until a better system of packing should be adopted. In putting up his own supply he picked and sorted carefully, carried to the cellar in baskets, and put in barrels, leaving the heads out so the moisture could escape. His cellar was kept cool and well ventilated, and his fruit always kept well. He never disturbed his apples till he wanted to use them. His best keepers were the Spy, Greening, and Canada Red. He thought dealers set a bad example in the manner of packing, and would not advise farmers to come to town to see how it was done.

Mr. L. P. Alden said this was a subject he was very much interested in; it was one he could talk upon with tears in his eyes: it brought up sad recollections. He had dealt in apples a good many years, had bought and sold quite largely. In his early career as a dealer he had been sadly imposed upon when buying apples already packed. He gave quite a humorous account of his experience with a lot of several hundred barrels which he had shipped to Minnesota. On opening they were found to be a great cheat, the greater part of the interior of the barrels being small, inferior fruit and badly decayed. It required much ingenuity and hard work to get rid of them. He finally traded the last of them off for some poor butter. In later years he seldom bought any packed apples except from well known parties. He spoke of several persons whose fruit could always be relied upon as being well and honestly put up, among whom was Mr. Luke Joseph, of Quincy. By exercising unremitting care in packing, the fruit put up by Alden & Co. had acquired quite a reputation and brought a premium in market. He said a very important thing in packing apples was to thoroughly shake them down. They would then need but little pressing. Respecting the size of barrel, he preferred large ones, as the cartage, freight and commission was no more per barrel and the retail dealers knew the difference between large and small barrels and would pay accordingly.

According to appointment, Mr. Isaac Grundy read a paper on the propagation of trees and plants. Mr. G. has much practical experience in this department and is also a well educated botanist.

As the constitution of the society provides for an exhibition of fruits and flowers at the June meeting, a committee of three was appointed to report a plan of such exhibition at the next meeting. The committee consists of J. H. D. Warren, Mrs. E. G. Fuller, and J. D. W. Fisk, Secretary.

Corn planting in this section is pretty much over with. The crop has been put in good shape as a rule, and about the usual number of acres. Rather poor reports of the wheat crop are still made, farmers claiming that the insect and winter killing will preclude the possibility of a full crop.

THE CIRCULATION OF THE SAP.

A PAPER READ BY MRS. J. D. W. FISK.

" By nature's swift and secret working hand
The various vegetative tribes,
Wrapped in a filmy net, clad with leaves,
Draw the live ether and imbibe the dew;

By Thee disposed into congenial soils,
Stands each attractive plant, and sucks and swells
The juicy tide; a twining mass of tubes,
At Thy command the vernal sun awakes
The torpid sap, detruded to the root
By wintry winds; that now, in fluent dance,
And lively fermentation mounting, spreads
All this innumerable-color'd scene of things."

So sang one of nature's truest poets. But when you ask me to reveal the hidden things of nature, I am reminded of the question put to one of old: "Who is this that darkeneth counsel by words without knowledge?"

As we gaze at the oak, whose branches are tossed so defiantly to the storms of wind and rain, and whose sides are so deeply furrowed by age, the question naturally arises, what agencies have been at work, to transform the tiny germ, so carefully hidden within the acorn, into this mighty monarch of the forest.

The popular idea that the sap ascends the tree, in the spring, and remains somewhere until fall, and then descends again, seems after all to be only partly erroneous.

It is true that the sap ascends in the spring, and it is also true, that it does so at all other times, when the ground is warm enough for the roots to extract moisture therefrom. Stockhardt found by actual experiment, that the wood of a tree contains more sap in the months of December and January, than at any other time of the year. This, upon reflection, seems reasonable.

But in order that we may fully understand and intelligently follow the sap in its circulation, it will become necessary to look a little at the structure of the plant or tree.

The basis of all vegetable organization seems to be the cell. These cells are minute closed sacks (being only from one one-hundredth, to one three-hundredths of an inch in diameter), are filled with fluids and are therefore capable of assuming a variety of shapes and positions by compression from within or without.

As the plant expands in growth, the cells, too, expand and divide and subdivide, thus making two or more perfect cells from one. Some of them contain *air*, others are filled with starch, and whatever may be stored up for the future use of the plant. Others become hardened by the deposition of various matters, and thus woody fibre is formed.

It is through the wood cells, too, that the sap passes on its way to the leaves. The wood cells seem to contain air as well as water, and both air and water are greatly affected by heat and cold, both are expanded by heat, and both contracted by cold.

Water is said to increase in volume one-twentieth of its own bulk on being raised from the freezing to the boiling point, and air increases its bulk one-third by the same change of temperature. The crude sap is composed largely of water, which is absorbed by the roots and evaporated by the leaves. When we take into consideration the fact that most of our forest trees lose their foliage early in the autumn, before the ground is frozen sufficiently hard to cause the roots to cease their labors, and that the roots renew, so to speak, their pumping process, whenever there is a sufficient rise in the temperature, is it any wonder that the whole body of the tree becomes gorged with sap? This sap, according to Prof. Johnson, remains motionless until the leaves are sufficiently expanded to perform their peculiar functions, unless some external cause acts

upon the tree. Of this external cause we have an illustration in the maple when it is tapped and the spile is driven in. The sap, in its endeavor to fill the vacuum makes its escape, and will continue to do so until the supply is exhausted or the temperature falls.

So, when the weather becomes colder, the air and water contained in the cells contract, and the flow of sap ceases, but when the sun again shines forth, "with refulgent ray," warming and enlivening every living thing, the air and water are again expanded, and rushing out of the orifice are followed by the sap. And thus it continues alternately to ebb and flow, with the changes of the atmosphere, until the leaves are developed, when the external flow ceases altogether, since this superabundance of sap is evaporated by the leaves. Now, nature is ready to begin the true function of vegetable life.

The roots, or, speaking more definitely, the mouths, which are at or near the extremities of the roots, are constantly at work, sucking in and forcing up water and whatever mineral and vegetable matter the water may hold in solution, or at least so much of it as that particular plant may require for its growth and development, for vegetation has the power of selecting what is adapted to its individual wants, and rejecting all else.

This is called the crude sap, and is drawn in and forced up the body of the tree into the leaves. The amount of water thus pumped up is immense.

Hales, who first experimented in this matter, found there was sufficient upward pressure from the stump of a grape vine in the spring, to balance a column of water thirty-six and a half feet high. The sap ascends the tree through the wood, every part of it except the heart, which is, so to speak, dead. When it has reached the leaves it undergoes a complete change, by contact with the air, giving off its surplus water by evaporation.

The quantity of water given off in this way is truly wonderful. It is said that a common sun-flower, only three feet high and containing between five and six thousand square inches of leaf surface, has been found to give off from one to two pints of water in twelve hours; this will give one some idea of the vast amount of evaporation carried on by the leaves of our forest trees. This process of evaporation seems to be the particular function of the under side of the leaves, and here, as elsewhere, we see that wonderful adaptation of means to the end, that characterizes all the work of our Creator. The cells of the under side of the leaf are of a different form and much more loosely put together than those of the upper side of the same leaf, thus giving more and larger intercellular spaces on the former than on the latter, and all these spaces are filled with air. Take, for example, the leaf of the white lily. On the upper surface there are only three thousand stomata to the square inch, while on the under side of the same leaf, sixty thousand are found. As evaporation takes place most rapidly in bright sunny weather, if, by chance the leaf should be reversed and all these months exposed to the scorching rays of the sun, the water would be given off so rapidly that it would be nearly or quite impossible for the roots to supply the demand.

"Let no presuming, impious railer tax
Creative Wisdom, as if aught was formed
In vain, or not for desirable ends;"

The sap being condensed, having lost a large per cent of its water and gained in density and richness, is now prepared to nourish the plant and begins its downward course. In exogens, or outside growers, this movement is along the

new layer being formed between the wood and bark, termed the cambium layer, and this cambium layer is only the continuation of the cells and fiber that form the frame work of the leaves.

About the descent of the sap, botanists disagree. Mr. Lincoln, Professors Grey and Wood, who have been considered the authority on botanical subjects, maintain there is a regular flow downward of the nutrient matter, and support the theory by facts, which they claim can be accounted for upon no other hypothesis. Example: Girdle an exogenous tree by removing an entire ring of bark, and the tree will flourish during one season and form a new growth, above the wound, but not at all below. The next season the tree will die. Why? Because the true sap cannot descend to nourish the roots. Again, if a ligature be bound firmly around the body of a tree, its growth is checked below, while the part just above the ligature, exhibits, after a year or two, a circular swelling evidently caused by the interruption of the descending sap.

On the other hand, Prof. Johnson, of the Sheffield Scientific School of Yale College, who is equally good authority, asserts that there is no downward flow of the sap, but simply a general distribution of the nutrient matter to the organs of growth, and this circulation takes place by what we may call permeation.

The walls of the cells are so constructed that, notwithstanding they are entirely closed, the fluids interchange themselves, perhaps, upon the principle of endosmose, or flowing in, and exosmose, or flowing out of fluids. For example, two contiguous cells containing fluids of different density, will interchange their fluids until they have a common density, and this motion if kept up will result in the circulation of the sap through the entire vegetable fabric.

Precisely how the action or change takes place in the leaves, perhaps, we may not understand. It has, however, been shown by experiment, that during daylight plants do take carbonic acid from the air, use the carbon, and give off the oxygen, and during the night just the reverse takes place, so that during the day plants render the air more pure, and better fitted to sustain animal life.

And this is accomplished at the same time that they are assimilating the crude sap to their own use, giving off the water and taking in carbon for the nourishment of the plant. The true sap then commences its descent, and whether it reaches the root by permeation, as has been described, or passes through the cambium layer it matters but little.

In studying the structure of the tree, we are led to exclaim, "In wisdom hast Thou made them all, for who but an all wise and beneficent Being could have so arranged the various cells and tissues that each should secrete its own juices without interfering one with another."

GARDENING.

A PAPER READ BY MRS. J. P. M'GOWAN.

"And the Lord God planted a garden eastward in Eden, and there he put the man whom he had formed," "to dress it and to keep it."

In this day and age of the world, a spirit of inquiry and investigation prevails, and many wise conclusions are reached.

There are those who would have us disbelieve everything in which we have trusted since our earliest years, and call them untruths, myths, or allegories.

There was no such thing as the cherry tree and the little hatchet; no Poco-

hontas rescued John Smith from the fury of her tribe; William Tell shooting the apple from the head of his boy is but a myth, and the whole description given of our first parents in the opening chapters of what we were always taught was *the book* is but an allegory, not a true history. However, it is just as pleasing to me to believe that our first parents sprung direct from the hand of God, and had for their home that beautiful garden filled with all manner of fruits, as that we were all evolved from a protoplasm,—a simple cell.

And thus we find gardening to be the oldest occupation in the world, and all along down through the history of the various nations into which the world's inhabitants have been divided, we find accounts of their gardens, which they cultivated more or less successfully. Some were devoted to flowers, some to trees, being more parks than gardens.

The Persian kings adorned their parks with cypresses, and as their obelisk like forms resembled a plane of fire, the king in whose reign Zoroaster appeared planted them around the Temple of Fire, and they were said to have originated in Paradise.

The first notice of a garden in the historical records of Rome, is that of Yarquinius Superbus, five hundred and thirty-four years before Christ. One adjoining the royal palace is mentioned, which contained a profusion of flowers, among which the rose and poppy predominated.

Pliny says, "the Romans highly esteemed small gardens filled with roses, violets and other sweet-scented flowers, while many of the plants and flowers we most admire were cultivated by the Greeks, they not considering them luxuries merely but absolute necessities."

With the fall of Rome horticultural art declined, and was not again revived until long after in monastic institutions. We read that the Dominicans had a hot-house in their convent at Cologne in the thirteenth century, where they preserved fruit trees and flowers throughout the winter by maintaining a pleasant degree of heat.

The introduction of hot-houses into our gardens, seems, however, to be of much more recent date.

Ripe pineapples were first obtained at the end of the seventeenth century, and Linnaeus says the first banana flowered in Europe in 1731, at Vienna.

Gradually as civilization advanced has gardening been carried on more and more perfectly, until now in many places and countries the horticulturist takes a high rank, and horticulture has been raised to an art instead of being a mere occupation. And what a wonderful, glorious art it is, where one is brought into constant and close communion with nature and nature's God!

What can be more fascinating or delightful than to watch the growth of plants? First the tiny speck of green just discernable, then the leaf, the stem, the bud, the flower, the fruit. By studying and following nature's laws how much can be done to change and improve the different varieties of fruits, flowers and vegetables.

Leigh Hunt says: "What a perpetual reproduction of the marvelous is carried on by nature, and how utterly ignorant are we of the causes of the least and most disesteemed of the commonest vegetables, and what a quantity of life and beauty and mystery and use, and enjoyment is to be found in them, composed out of all sorts of elements, and shaped as if by the hand of fairies! What workmanship with no apparent workman! What consummate elegance, though the result is but a radish or an onion!"

A writer describing a German agricultural fair, says: "No one knows who

has not seen it worked into an architectural design, how beautiful a string of onions can be, how gorgeous a row of vegetable marrows, how delicate a cluster of turnips."

This art of gardening, which is but the common name for horticulture, has been defined to be the most perfect method of tilling the earth so as to produce the best results in the form of fruits, food, and objects of beauty from the vegetable kingdom, and is but another term for improved methods of farming. It is usually divided into flower, fruit or vegetable gardening, while these again are spoken of as amateur, or for profit.

In gardening for profit either in dollars and cents, or the benefit of the family, a combination of the three kinds is advisable, while the size of the garden should depend upon the wants of the family, and amount of experience one possesses.

Be sure and not undertake too much,—a little land well tilled is far better than a great space but imperfectly cultivated, and if a beginner commences on too large a scale disappointment will be his reward.

Provide yourself with the proper tools. A plentiful supply of the most improved kinds will insure you greater success with much less outlay of labor as well as in farming. If you can have your choice of soils, take the sandy loam with a gravelly subsoil, either level or slightly sloping to the south or east. The ground should be well and deeply worked. The plow and harrow are most efficacious where there is sufficient space for their use, otherwise the work must be done with spade and fork. It is well to work the ground in the fall, leaving it rough, thus allowing the frost to act upon it, making it ready for use earlier in the spring; but Henderson says, "by no means plow, dig, harrow, rake, hoe, or in any way stir the soil when wet enough to clog," that "the crop is not only injured for the season," but that "in some soils the bad effects show for years." Manure should be used freely. Well rotted stable manure is considered best, and for vegetables the whole surface should be covered at least three inches deep, and this should be thoroughly mixed with the soil. Wood ashes are also much esteemed, while nothing that will enrich the soil or promote the growth of plants should be wasted,—refuse of all kinds should find its way to the compost heap. Decide next what you will plant, and "don't plant too much at first, but what you do plant, make it count."

Every family should have good variety of small fruits—strawberries, raspberries, black and red, blackberries, currants, gooseberries, and don't forget the grapes. They will grow almost anywhere. It seems as if a good supply of fruit would bring health and happiness to every family, saving many grocer's, butcher's and doctor's bills. After determining what proportion of fruits and vegetables you will raise, lay out your garden accordingly, assigning a certain portion to each, while the flowers can be used for bordering these plats.

Plant everything in rows. This makes cultivation easier, and really adds to the beauty of the garden.

The distance between the rows depends upon the plant, and the kind of culture to be used. Where land is plenty, cultivate with a horse by all means,—Root says, "one horse, with a cultivator, is worth ten men with hoes,—then your rows will need to be farther apart than in hand cultivation.

There should be a rotation of garden crops, as well as field. Root crops should alternate with those cultivated for their leaves.

If economy of space is necessary, you can, by a little care in the planting of

late varieties between the rows of early ones, make your ground bear two or three crops a year.

For planting the garden select the best of everything—the best varieties, the best plants or seeds. Even if the first cost is a little more, it will pay in the end.

In the sowing of seeds great care should be taken with regard to the depth of planting, temperature, condition of soil, and moisture.

The nature of the seed must be consulted. Peas and beans do not need as finely pulverized a soil as celery, neither should the depth of sowing be the same. Peas will germinate at a temperature but little above the freezing point, while beans would decay. Some seeds have tender skins and germinate quickly, while others have almost a horny covering and require a much longer time. When the seeds are out of the ground work begins in earnest. Some one says “garden work needs a large stock of patience, and is said to be an excellent discipline for an irritable temper.”

The weeds will grow as well as useful plants, and constant care is needed to keep them in subjection.

Work one week and rest the next will not answer, but a little done every day will accomplish all.

A crop of weeds and other plants cannot be raised together under any circumstances, and one must cultivate in season and out of season.

A gardener says, “remember tillage is manure, tillage is earliness, tillage is moisture in drought, and you cannot give too much of it.”

But the garden has other enemies than weeds. Cutworms and other worms, insects of various kinds, for all of which there are prescriptions innumerable,—fresh sods or balls of clover laid among the plants to trap the cutworms, boxes with glass tops, Paris green, ashes, etc., etc., for insects, salt for worms,—but highly enriched soil and thorough cultivation, so that plants shall grow rapidly, seems one of the most effective measures.

One gentleman has had excellent success in destroying insects by the use of manure water. Cut-worms have also fled before it. He showers the whole plant, whether flowering or vegetable, with the water.

Although gardening signifies labor, it also means pleasure and beauty, and we believe that every man, woman and child would be happier, healthier and better for the cultivation of a little plot of ground.

The Home Journal says, “the day is coming when a lady will feel more ashamed to confess an ignorance of flowers than of music,” but there is certainly no reason to limit her knowledge to *flowers*. Let her be acquainted with *all* plant life.

Our insane asylums would doubtless have fewer inmates, if some of the wives and mothers who toil from early morning until late at night indoors could have an opportunity to spend a little time each day out of doors, breathing the fresh air, and resting by a change of occupation, while watching the growth of a variety of plants would give a healthy tone to the mind. Mr. Henderson tells of an acquaintance whose duties compelled him to be at his desk in the city from 9 A. M. until 4 P. M., and as a consequence dyspepsia was likely to compel him to resign. He was a man of forty, without any knowledge of country life, and very reluctantly he changed his city home for a cottage in the country. This was built upon a lot fifty by one hundred feet, and he was troubled what to do with the land. Mr. Henderson told him he believed the cure for all his bodily ills lay in that little plot of ground, besides it would

add to the comfort and luxury of his table if he would cultivate it. "I work it!" he exclaimed "you don't suppose these fingers could dig or delve," holding up his thin bloodless fingers, "and if they could, I know nothing about gardening."

The result of the conversation was that he concluded to try, and try he did to a purpose.

By working an hour and a half each morning, he dug the ground all over himself, set plants, sowed seeds, and thus furnished his family with an abundance of fresh vegetables and fruits all the season, and became strong and rugged in health.

More than all others it would seem that the *farmer* might, and would be the possessor of an excellent garden. Land is plenty, there are plenty of materials for putting the land in good condition, and all the implements necessary for use are on hand. But what do we find on many farms? All the time, strength and capital are needed (or believed to be) to grow wheat, corn, etc. All good and desirable in their place, but one doesn't want to live on these alone. One wants something besides bread and meat for breakfast, meat and bread for dinner, and what is left, for supper.

You may visit places where your diet will consist of bread, pork, dried apples and potatoes, early in the season; later, the potatoes will be missing, and the women folks may be seen searching around out of doors, that possibly they may find something green. Every dandelion and dock leaf is seized upon, all the cowslips are made way with, and if there chance to be a few straggling currant bushes, they will be laid under tribute almost as soon as out of blossom, and before the fruit is worth anything, it is all gone. Now wouldn't a good variety of vegetables and fruits be more toothsome and healthy? Would not a farm command a greater price with a well tilled garden upon it, than without? As gardening is the oldest, is it not also one of the most important and pleasant occupations of life?

SOUTH HAVEN POMOLOGICAL SOCIETY.

OFFICERS.

President—W. H. Hurlbut.
Vice President—N. Phillips.
Secretary—J. G. Ramsdell.
Treasurer—Henry Chatfield.
Librarian—F. H. Chesebro.
Entomologist—L. H. Bailey, Jr.
Botanist—A. G. Gulley.

This Society has held weekly meetings during the entire year, and although the full text of proceedings is not given, all the minutes of the more important meetings are appended in full.

POMOLOGY vs. FARMING.

READ AT THE ANNUAL MEETING, JANUARY 7TH, BY C. J. MONROE.

Mr. President and Gentlemen of the South Haven Pomological Society :

When your committee assigned me this subject I designed to give it attention and examine the facts and figures at my command, hoping to present to you substantial reasons for any views I might advance, but sickness prevented consideration of it just before your annual meeting, so I gave it up.

I consented to present a few thoughts on the subject to-night with the understanding that it was made the special order for this evening's discussion, hoping thereby to draw out something of interest and value from others who are better posted.

In no way can we form so correct conclusions of the value of our particular business as by comparison with others, hence it seems to me that the time this evening can be profitably spent in the proposed examination of the relative advantages of Pomology and Farming.

Complaining is catching—and in times like these, when nearly everybody puts on a long face, and repeats with many changes, that "it is hard times," it is not strange that we should have our share, and so get uneasy and waste time in wondering if there is not something better than our particular business or locality.

I know of no better way of settling this point than by looking about us and seeing what others are doing, or at the inducements that other places or business may offer.

If we may believe the papers we read, or the statements of friends or strangers with whom we correspond or converse, we shall not find many inducements to change, for I cannot learn of a single trade, profession, business or place which does not have its full share of complaints and drawbacks. The thousands of idle men and hundreds of idle mills tell the unfortunate state of the manufacturing and mining interests; the idle boats and idle seamen, the cutting down of railway employes in number and wages, and the non-payment, by a large number of the roads, of the interest on their bonds, show that all is not smooth sailing in transportation; the daily announcement of numerous

failures in the mercantile business indicate the unsatisfactory results of trade; the eagerness with which many people followed H. G.'s advice to "Go West" has received a severe check by the army of grasshoppers which visited so many of those favored localities and threaten starvation to the inhabitants.

I mention these things which may not seem pertinent to the question, as I think a little thought and comparison of this kind will be of value to us—especially as I find quite a number of these who claim, in a very wise way, that this fruit raising is a humbug, all well enough to talk and write about, but poor to practice.

To the casual observer there may be some occasion for all this, but the more thoughtful and experienced certainly cannot come to any such conclusion.

It is a general rule that any permanent and successful business is of slow growth; this is equally true of the country. It is a common remark, backed by history and experience, to take the forest, clear it away and make homes, with all the accompaniments of roads, bridges, school-houses, churches, etc.; and get so that a majority are out of debt and live at home, as the saying has it, requires a full generation of thirty-three years. According to this we have considerable time in which to develop, for we are hardly more than in our teens, and this is a business where we do not sow in the spring and reap in the summer and fall, but plant this year and wait from two to six years for the "*fruits*" of our labor, during which period it is *outgo of time and money*.

When I think of the comparatively few acres cleared in this vicinity, and the fewer bearing crops of produce or fruit, as they should and may with better cultivation, I am surprised at the wonders—yes, I may safely say *wonders*—our people have accomplished, in the paying for land, clearing it for crops, setting of orchards and caring for them, building houses and barns, with all the public improvements of roads, bridges, school-houses, churches, harbor improvements and railroad building, with our full share of other difficulties incident to a new country.

But more to the subject, as to the relative profits of pomology and farming. I have examined the average yield of the State for most of the years from 1865 to 1875. I have selected those of the year 1871, as I think them the most likely to be about right, as they had the advantage of the U. S. census of 1870.

I have also taken those of our own State as I find them about medium (compared with other States), as to the cash value per acre of the following staple farm products, viz.:

Corn.....	\$19 11	Barley.....	\$21 57
Wheat.....	18 48	Buckwheat.....	11 85
Rye.....	10 94	Potatoes.....	56 44
Oats.....	14 02	Hay.....	14 90
Average.....		\$19.47	

I find the average of these same crops for the year 1875 to be \$17.53.

Thus \$20 gross cash value per acre would be the outside figures for these crops, and a liberal average for all the States.

In the matter of fruit statistics I do not find them so accessible or reliable. General fruit growing has been more confined to favorable climatic localities, and care has not been taken in gathering regular statistics, or, at least, in preserving them; hence we have to rely on reports of individuals and societies in these fruit-growing sections, which have the misfortune of being made by interested parties, however correct they may be.

The fact that these reports generally give the locality and *names* of parties, thus enabling any who may wish, to obtain statements from first hands, should entitle them to credit.

In the fall of 1874 Secretary Bidwell addressed the following questions to 100 of the largest fruit-growers of this county, to wit:

Value of your orchard per acre?

Value of adjoining land?

Comparative yield and extent of your orchard in 1874 compared with 1872-3?

Price realized for fruit?

The parties very generally answered, and from these answers and other statistics the Secretary felt warranted in the following statement of *net* values per acre for the average yield of 1872-3-4, viz.:

Apples	\$60 73	Cherries	\$419 67
Peaches	343 99	Grapes	386 83
Pears	446 00	Strawberries	265 36
Plums	347 00	Currants	470 60
Average per acre for all fruits		\$342.52	

The Fruit Growers' Society of Western New York in 1855 sent out a circular with similar questions to the above, to committees in twenty-three counties; also similar questions were sent out by the leading Pomological Societies of Delaware, New Jersey, Maryland, Illinois, Ohio, California, and probably most of the other States—although I have not seen them—to different parts of their respective States.

It will also be remembered that St. Joseph has sent out a number of statistical reports; also our neighbors at Saugatuck. Grand Haven made a very full and complete report of its orchards and vineyards in 1871, giving names of growers, number and kind of trees, number of vines, baskets of peaches, pounds of grapes, bushels of apples, quarts of berries, and *net proceeds*.

While in the main these statistics are estimated, yet, judging from the care shown in gathering them, it seems to me they can be accepted as substantially correct. Although my limited time has not permitted me to follow out the comparisons as fully as I would like, yet I feel safe in drawing the conclusion that the reports of the different States and localities mentioned above do not differ in general averages one with another more than the statistics of the farm crops of the several States.

It may be suggested that these fruit statistics are limited to favored localities. In answer to this I would remark that *general* fruit growing is limited by climatic and natural causes to certain places, and as our farm statistics were taken from States which are recognized as favorable to those crops, so we must seek localities prepared by nature for raising the staple fruits.

After due allowance for the fact that it takes from two to six years before we begin to realize from our investment, and a liberal deduction for other contingencies, I should place Pomology *three* to Farming *one*, as to *profits* on an equal expenditure of time and money for a period of twenty years.

As to the relative certainty of these crops each year, I think *only* one failure in twenty years, and that only of the peach, answers this question quite satisfactorily,—to us at least. Besides, experience has abundantly proved that the certainty of a general fruit crop is as sure as that of the staple farm crops, and that we take no more chances in the future, of the one than the other.

As to prices,—especially in years of abundance,—I am satisfied that the

minimum prices received for fruit would *net* more for the time and money expended than farm crops at ordinary prices, with the majority of years returning from three to five times as much.

The past year has done more to convince me of the *future* steady price of fruit than any *other* one thing since I became interested in the business. While the general cry has been low prices in nearly everything produced or manufactured, that of fruit has been fair to good.

It was very common for growers during the past season to state they were getting from 10 to 25 per cent better prices than expected.

As to the relative supply and demand of these crops, I think it many times in favor of the pomologist. In fact, there is no one question connected with the raising of fruit, about which I am so content as *its* future supply and demand, for the reasons—

1. Natural climate influences, with the clearing of the country, are reducing the territory.

2. Markets and the facilities for reaching them are rapidly increasing.

3. The numerous enemies to tree and fruit will render both worthless, and discourage a large number who allow fruit trees to stand on their places without care or cultivation.

4. The supply of perfect fruit will be left to those localities enjoying natural advantages, and to individuals who are willing to fight these enemies of trees and fruit.

5. The improvement in drying, canning, and preserving very largely increases the demand, especially for the more perishable sorts.

6. The appetite for fruit is growing, and each year it is becoming more a staple article of food.

The pomologist is more of a commercial man than the agriculturist; he has to do with the shipment of his fruit, and with distant and different markets, thus bringing him more in contact with other classes of business and with the outside world, thus adding variety to his life and increasing the pleasure of his occupation.

There is one more contrast between pomology and agriculture to which I would like to call your attention; I will then leave this question to those who will keep closer to it than I have,—it is this: I believe it to be an established fact in every country that as they grow older the land accumulates in the hands of the few, as owners, and the farms are worked by tenants and hired help.

In fruit-growing sections the tendency seems to be to divide up into smaller places, each owning his own homestead. To my mind this is a valuable feature, for in proportion as the people own their own homes and share the responsibility of society and government, in that proportion are they better citizens, socially and morally, and our institutions are safer and more permanent.

ADAPTATION OF OUR SOIL AND CLIMATE TO FRUIT GROWING.

READ AT THE ANNUAL MEETING, JANUARY 7TH, BY I. S. LINDERMAN.

Mr. President and Gentlemen of the Society:

Our climate is a subject of the greatest importance to us, for upon the superiority of that depends, to a great extent, our unequalled success in fruit growing. This subject has been discussed among us for years, both orally and through the means of the press, and some may think it has become threadbare at least, if not entirely exhausted. I hope, however, to be able to throw some

additional light upon it, and with that object in view I appear before you, in response to an invitation of your committee.

The history of fruit growing might be traced back to a certain garden, in which "grew every tree that was pleasant to look upon," and in which our great-grandparents were placed "to dress it and to keep it," and in which the first test of the quality of fruit was made: but this would add nothing to our knowledge of any practical benefit, so we dismiss the ancient and speculative and come at once to the present and practical.

Fruits of different classes and kinds have each their peculiar characteristics. Soils and climates have their peculiarities, also. This being the case, it will be necessary to inquire into these peculiarities somewhat in order to arrive at a correct understanding of our subject. In all temperate climates, with suitable soils, fruits are a natural production. These natural fruits are generally very hardy, being natives of both the soil and climate, but they are generally of inferior quality. To the improvement of these natural fruits we are indebted for all our finer varieties, and while we have made wonderful progress in quality, we have undoubtedly lost somewhat in hardiness, for, as a rule, I believe our finest varieties possess less hardiness than natural fruits. Each of the different classes and kinds, however, have their peculiar characteristics, as before stated. Some may be grown in almost any soil: the stiffest clay, the alluvial bottom, the sandy plain, or the rocky mountain side: and in a climate varying from 125 degrees in the sun to 50 degrees below zero in the shade. Very few, however, if any, of our choicest varieties of fruits can endure these extremes. The grape and the apple are perhaps the best representatives of extreme hardiness, succeeding tolerably well in a greater diversity of soils and climates than any other kinds of fruit in general cultivation. This extreme hardiness, their great productiveness, their almost innumerable varieties, adapted to all climates from the frigid to the torrid zone, their adaptability and healthfulness as human food: these, and many other good qualities, constitute them the most valuable of any two kinds of fruits with which our Creator has blessed us. Notwithstanding this extreme hardiness of the hardiest varieties of these fruits, there are but few localities, comparatively, where the finer varieties can be successfully grown and are really at home.

If this is the case with these, the hardest of our fruits, what have we to expect from our more delicate fruits, natives of a warmer climate, that we have transferred to a climate not congenial to them, being subject to extremes entirely beyond their powers of endurance? This applies more particularly to our special favorite, the peach. This delicious, universal favorite, the most beautiful of all fruits, is one of the tenderest grown in the open air in any of the northern States, and can be successfully grown in but very few localities. Being such a universal favorite, such a delicious fruit, so beautiful, and lasting so short a time, it is no wonder that it sells for high prices—among the highest of any fruit grown. It is also the most productive perhaps of any fruit. With all these good qualities and requisites for money-making, there is one serious drawback, viz.: their inability to withstand extremes. The conditions of both soil and climate must be favorable, or failure is certain. This being the case, it is of the utmost importance that we know in advance the requisites of success. They will not succeed in a very heavy clay. They will not succeed in a wet soil heavy or light. They will not succeed where the temperature is frequently 20 to 30 degrees below zero, for the latter frequently destroys the life of the tree, and the former that of the fruit bud. But this is only negative information.

The conditions essential to success are as follows: SOIL.—This may be from a medium clay to a light sand, provided they are well drained and free from surface water, either naturally or made so by thorough drainage. This is an essential that cannot be dispensed with, or failure will be inevitable. Soil may be found in nearly all parts of our State, perfectly adapted to the growth of this fruit, but the fact that it is not grown to any extent except in the Fruit Belt, is ample proof that there is some cause for the failure. There is only one reason why this favorite fruit is not grown in all parts of our State with as uniform success as the apple, and that is the severity of our climate. This is the greatest and insurmountable difficulty in all the Northern States, except a few localities peculiarly favored and protected from the natural inclemency of our climate. This protection can only be enjoyed through the protecting influence of large bodies of water that remain unfrozen through the extremest cold. Wherever this exists, it will afford protection, in proportion to the width of the unfrozen surface.

Having thus stated general principles, let us apply them to the particular subject under consideration, viz.: “The Adaptation of Our Soil and Climate to Fruit Growing.”

Our soil is peculiarly adapted to fruit growing for the following reasons: 1st, Particular kinds and varieties of fruit require different soils for their successful cultivation. Some require heavy, and others light soils. Some require dry, and others moist soils; and the fruit grower, in order to succeed well, must raise a variety of fruits that ripen in succession; this necessitates a variety of soils. This diversity of soils is a peculiar characteristic of our vicinity that I have never seen equalled in any other section of country. It is a common occurrence that on a ten or twenty acre fruit lot we may find several kinds of soils,—one portion a clay loam, another portion a sandy loam, another a sandy muck, etc. These combinations and variations constitute a soil unsurpassed for fruit growing purposes. Practical fruit growers need not be told, for they are well aware of the advantages arising from this diversity of soils; and, notwithstanding this, we are free from the extremes of very heavy clay or light and drifting sand hills. All fruits that can be successfully grown in a temperate climate seem to be at home among us, and attain their greatest size and excellence, as our numerous exhibitions and first premiums have abundantly demonstrated,—having never failed of carrying off the first prize where we have competed for it. This proves conclusively, I think, that our soil is not only adapted to fruit growing, but that its adaptability exists in a preëminent degree.

Having a soil perfectly adapted to our success, there is one other essential of still greater importance, and that is climate.

I believe that we are favored with a climate unexcelled, if not unequalled, in this latitude between the Atlantic coast and the Rocky Mountains. As a basis of the correctness of this belief, I offer the following synopsis of the extremes of cold for the last eight years, taken from my record of extremes:

December 1868 to April 1869, not below zero.

“	1869	“	1870, 1° below zero once.
“	1870	“	1871, as low as zero once.
“	1871	“	1872, coldest -5°; only below zero twice.
“	1872	“	1873, coldest winter on record to that date; below zero nine different days.
“	1873	“	1874, coldest day January 31st, 5° above zero.
“	1874	“	1875, coldest day February 9th, 16° below zero for a few moments only; during the winter it was below zero seven times.
“	1875	“	1876, coldest 5° above zero.

For the last eight years we have had two winters five degrees above zero the coldest, two winters just zero, and four winters below that point from one to nine days each. The aggregate number of days below zero for the eight years is nineteen. This subject of the superiority of our climate, is of the greatest importance to the whole people of the northwest, and especially to those engaged or proposing to engage in the business of fruit growing. This being the case, every available means of disseminating information should be improved. Our claims should not only be spread before the people, but the proof necessary to establish their correctness. This can be accomplished most effectually by definite statements and comparisons.

Beloit, Wisconsin, is directly west of us, about 66 miles from the west shore of Lake Michigan. Every winter for the past eight years it has been from 16 to 24 degrees colder there than it has here. I refer to that place particularly, because I receive a daily record of the weather and temperature, once a week.

I will now revert to the winter of 1872 and 1873, the coldest to that date, but which was duplicated two years later. For convenient comparison, I will place the record of the two winters, also the names of places east and west of us, in juxtaposition:

Winter 1872-3.		Winter 1874-5.	
December 24th.		February 9th.	
South Haven.....	-14°	South Haven, for a few moments, clear and very still.....	-16°
Beloit, Wis.....	-40	February 18th.	
Janesville, Wis.....	-40	Beloit, Wis.....	-40
Grand Rapids, Mich.....	-40	Janesville, Wis.....	-40
Lansing, Mich.).....	-33	February 9th.	
Self-reg. Ther.).....	-45	Grand Rapids.....	-40
Tiffin, Ohio.....	-31	Kalamazoo, Mich.....	-34
St. Joseph, Mich.....	-22	Battle Creek, Mich.....	-34
St. Louis, Mo.....	-16	Sparta, Wis.....	-48
Centralia, Ill.....	-22 to -27	St. Joseph, Mich., became disgusted, considered thermometers unrelia- ble. <i>No report.</i>	
Chicago, Ill.....	-20	January 9th.	
In Minnesota it was believed that over 100 people froze to death.		Chicago, Ill.....	-28
Winter 1874-5.		Jacksonville, Ill.....	-24
January 9th.			
LaSalle, Ill.....	-28		
Springfield, Ill.....	-24		
Southern Kansas.....	-17		

From correspondence Prairie Farmer, 1875:

Feb. 12th—Kane county, Ill. It has been below zero 34 out of 43 mornings.

Feb. 20th—Janesville, Wis. For 38 days the *average* has been -14°.

Feb. 17th—Niles, Mich. It has been below zero 43 consecutive mornings.

The above shows a remarkable uniformity, not only in the two winters, but in the degrees of cold east and west of the lake, away from its influence. The degrees, however, do not express the whole of the difference in effect. A very sudden change has a much greater effect on man, beast, or trees, than a gradual change of the same number of degrees. West of the lake the changes are much more sudden than they are here. Allow me to introduce one example:

Monday night, Feb. 12th, 1872, at Beloit, Wis., it was 38 degrees above zero; Tuesday morning, the 13th, 6 degrees below zero was the score; a change of 44 degrees in half a dozen hours.—Beloit Free Press.

My record for the same time stands:

February 12th, 6 p. m., 36 degrees; Tuesday morning, 13th, 31, with high west wind getting cold very fast—40 degrees warmer than Beloit. Noon 22 degrees; 6 p. m. 10 degrees—being a change of 24 degrees in 12 hours against 44° at Beloit in a night

Their change 41° , ours 26° , a difference in our favor of 18 degrees. At St. Joseph, Missouri, on the same night there was a change from 52° above zero to 2 above the next morning; a change of 50 degrees, to Beloit 41° and our 26° .

I might continue these comparisons indefinitely, but it is unnecessary. I have this to say however—these comparative differences are not exceptions, but the rule, being nearly as great every winter. Fortunately for us, we are not confined to the record of the thermometer, to prove the correctness of our claims to superiority of climate. We have other proof that is conclusive on that point. Notwithstanding the extreme cold of 1872 and '73, we had a good peach crop the following summer, amounting to about fifty thousand baskets; while the combined production of all other localities in the Northwest was far below that amount. This is conclusive proof of the correctness of our record, and cannot be successfully controverted. After the foregoing statements, the following question will naturally arise: "If the winter of 1872 and '73 was as cold as that of 1874 and '75, why was our peach crop so near a failure in the latter case, when we had so good a crop in the former?" My answer is as follows:

In the fall of 1872 our peach buds were well ripened, and in the best possible condition. In the fall of 1874 they were also well ripened, but in November we had an unusually warm spell of weather that swelled the buds very much, and I had some that blossomed out on young trees. This left the buds in very bad condition for winter, and in December I predicted, as several in town can here witness, that if we had a severe winter our peach crop would be a failure, and yet, after all these unfavorable circumstances, we had between twelve hundred and two thousand baskets of peaches, and this is the only time that we have ever failed of a good crop. Of all other kinds of fruit, we had a fine crop. In view of the foregoing facts, I feel justified in claiming that it was not the cold winter that spoiled our peach crop, but the unfavorable condition of the buds in the fall, as the record proves beyond a reasonable doubt.

I now invite your attention for a short time to our record of the present winter, compared with other points, to see if it sustains us in our position, that these differences shown in our favor, are nearly uniform at all times when our record approaches zero:

Dec. 9th.—Beloit, Wis., -20° ; South Haven, 10° above morning; evening 6° above.

Dec. 16th.—Beloit, -12° ; Watertown, Wis., -18° ; here 2° above.

Dec. 18th.—Beloit, -12° ; Dowagiac, Mich., -12° ; here 8° above at 6 A. M.; clear, light wind, west; about 7 o'clock wind changed to east; at 8 A. M., zero; at that time wind changed suddenly west again, and in one hour it was 10° above; clear, with moderate wind.

This shows clearly the influence of our lake. A simple change of wind from west to east, for one hour lowers the temperature 8° ; then a change restoring the lake breeze one hour raises the temperature 10° , and this is only one out of many similar changes. During the present winter it has been from 15° to 20° below zero at Lansing, and various other places in our State, while here we have had only one morning below zero this winter. December 10th, it was 2° below.*

This is a very comprehensive subject, and a whole evening might be profitably occupied in its consideration, but in the brief time allowed on the present

*The records introduced here are taken mostly from Signal Office reports, the balance from the various newspapers of the country. The reports from here are copied from my own record. My thermometer hangs on a post four feet from a building that breaks off the west wind, though it is exposed to that from the north.

occasion, I have been able to do but little more than briefly sketch a few of the principal points. I have endeavored, as best I could, with the material at hand, the limited time, and my poor abilities, to present for your consideration facts that I think prove pretty conclusively the following propositions, viz.: That our soil is unexcelled, and all that can be reasonably desired. That our climate is unequalled, and if not all that is desirable, it is at least the best attainable in the northwest.

February 5th.

The question for the evening was called, viz.: "What are the best varieties of small fruits for profit?"

J. G. Ramsdell made some very appropriate remarks in reference to fruit lists. He said these lists necessarily included sometimes unworthy varieties, but excluded ten to one hundred such where one was included, and to the inexperienced were invaluable. For one, he was ready to prepare a list to-day from the best experience he could collect, and revise it to-morrow, if he could improve it. There were many things to be considered in the recommendation of a certain variety of fruit. Certain qualities were present or absent in a variety which adapted or unfitted it for transportation, for keeping, for eating, for cooking, for canning, or for drying. A variety that possessed the greatest number of desirable qualities was sure to get placed first on the list. As an improvement in preparing a list he would suggest that the adaptability of each variety to soil, and climate, and use be expressed in connection. Such a list would be valuable to every one and would tend to increase the market value of the fruit.

N. Phillips wanted to set a quantity of small fruits in the Spring, and wished to get the experience and advice of the members of the Society. He thought the Wilson the best strawberry for profit, the Concord the best grape, and the Early Richmond the best cherry, the Kirtland the best red raspberry, the Mammoth Cluster the best black cap, the Kittatinny the best blackberry, the Houghton's Seedling the best gooseberry, the Victoria the best red currant, and the Black Naples the best black currant. If there were as good earlier or later varieties he would like to know it, to increase the length of the marketing season. If the Herstine was a better late variety of raspberry he would certainly like to know it. If the Triumph de Gand was a more profitable strawberry he would like to know that. If sweet cherries were more profitable here than sour cherries he would like to know that. If the Delaware grape paid as much as the Concord he would like to know that. If the Doolittle raspberry, the Lawton blackberry, and the Downing gooseberry were as desirable varieties he would like to know that,—and why.

D. E. Histed said he would set both varieties of each kind of small fruits.

C. H. Wigglesworth said he raised the varieties of small fruits that brought the most net money with the least fruit. If the Triumph de Gand strawberry brought three dollars a case and the Wilson two dollars, the Triumph de Gand netted more if it yielded but one-half. There was more money in half the fruit at twice the price, and the sooner the fruit grower found it out the better. It were better to let half the small fruit rot on the ground and market the best than to overstock the market with culled fruit. One hundred bushels of No. 1 fruit would sell more readily than ten bushels of inferior fruit. The best plan was to grow small fruits in hills, well trimmed and cultivated, and avoid

the weakening effects of too much wood and vine, which tends to increase the number, but decreases the size of the fruit.

Harvey Linderman said the Wilson was the best strawberry he had grown, though he had not the experience of Mr. Wigglesworth.

A. S. Dyckman said he was favorably impressed with the Herstine raspberry.

W. H. Hurlbut said the Clinton grape was the best wine grape—it kept well and held its flavor. It was acknowledged the best American wine grape introduced into France.

On motion, Messrs. Wigglesworth, Phillips and H. Linderman were chosen to prepare a list of small fruits, to report in two weeks.

February 19.

The subject for discussion was: Where shall we buy our Nursery Stock?

A committee was appointed at a previous meeting to report at this meeting a list of small fruits for this locality for market purposes. C. H. Wigglesworth, chairman of the committee, submitted the following report, which was voted to be laid on the table for one week:

The committee recommend the following varieties for market purposes:

Strawberries—Wilson's Albany for all soils; Triumph De Gand and Jucunda for clay.

Red Raspberries—Kirtland and Herstine for rich soil of any kind.

Black Cap Raspberries—Doolittle and Mammoth Cluster for rich soil of any kind.

Blackberries—Kittatinny and Lawton for rich soil of any kind.

Currants—Victoria, red, and Naples, black.

Gooseberry—Houghton Seedling.

Grapes—Delaware and Concord.

C. H. WIGGLESWORTH,
N. PHILLIPS,
H. J. LINDERMAN.

Mr. Wigglesworth ventilated the subject of buying fruit trees and other nursery stock of Eastern agents or nurserymen, saying we had been swindled out of thousands of dollars annually by a set of scamps who are traveling through the country taking orders for nursery stock.

He had bought stock of agents and nurserymen which proved to be worthless both in kind and quality; had bought Mammoth Cluster raspberries which were not Mammoth Cluster at all, but were of the wild varieties from the woods; also, peach and apple trees which proved to be not the same as ordered. He considered the great majority of both nurserymen and their agents no better than thieves and swindlers of the meanest class. Some of the nurserymen of our own State were no better, and gave an instance of being swindled by Bragg & Waters of Kalamazoo, and he declared he never would buy anything of them again.

H. Linderman recommended buying of home nurseries; he knew of men paying fifty cents for an Early Louisa peach tree, when it could be bought for half that price here at home. He had paid \$1 per dozen for strawberries not true to the kind, and bought fifty Wild Goose and Miner plum trees which were entirely worthless.

D. C. Loveday said we had much better wait one or two years for the trees to grow here than to buy of eastern men. Eastern trees were not reliable, either in kind or quality.

Mr. Sheffer gave a short but interesting history of his experience in purchasing trees of a western nurseryman, Phenix of Bloomington, Illinois; he sent

for samples of trees to Mr. Phenix, and received very nice large trees, which were entirely satisfactory. He then sent an order for the trees which he wanted, accompanied by the money, and received very poor, small trees, not at all like the samples, many of them not true to the kind ordered. He has no confidence in Mr. Phenix, and denounced him in round terms.

Norman Phillips said the people were to blame for buying of eastern nurseries. He had known of men paying \$1.25 for an evergreen from the east which he would sell for 35 cents.

A. Healey said we ought to buy our trees at home, when we could get the varieties and could do just as well in price.

Mr. Holcomb, of Athens, had had some experience in buying trees and plants of eastern nurserymen, and as a rule was generally grossly cheated by agents and dealers.

They could not raise peaches at Dry Prairie in this State.

Mr. Bidwell remarked that those who purchased and set trees for an orchard should make a careful plat of the whole orchard, and have a record of each variety set, which would save a good deal of confusion in after years; mistakes would happen in the nursery sometimes, and in this way we would be able to detect them.

J. G. Ramsdell said the chief cause of the mischief was in buying trees and plants of irresponsible agents, who went over the country taking orders, pretending to represent some one of the leading nurseries east, generally at Rochester or Geneva, having a catalogue as proof of agency. After taking the order they would go to some played-out nursery or to some irresponsible parties and buy up all the leavings of a block of trees that had been dug over, the best all taken out, and for a very low price, perhaps two or three cents apiece, would purchase the block; he would then proceed to fill his orders with these trees which he had sold for a large price. He thought the only way out of this trouble was to have nothing to do with eastern agents, but if we must buy our trees east, we should club together and send a good reliable man, well posted in selecting trees and plants, to the nursery, and make the whole purchase of responsible firms, and good trees could be got at wholesale prices, true to name.

March 12.

The meeting was called to order by Vice President Ramsdell.

The report of committee on small fruit list was laid on the table another week.

A. J. Pierce opened the discussion on the planting and protection of shade trees; preferred cherry, evergreens, larches and nut-bearing trees. Wanted low, branching trees, but could not protect them safely; the usual plan of up-rights and cross pieces at the top worse than useless, as they often injure the tree. Must settle the cow nuisance first; the commons are nearly all enclosed; must drive our cows to pasture if not too far, and boys could be trusted; otherwise we must dispense with cows; knew it would be hard on a few poor men, but it is done in other places, as at Kalamazoo, Paw Paw, Decatur, etc. The law gives a majority of people in each town power, through the Board of Supervisors, to exclude stock from the highway. It is not a matter of taste and pride alone, but of dollars and cents, and there is no alternative but to act at once; also urged the necessity of planting groves for timber, fuel, and climatic influence.

T. T. Lyon apprehended that the village charter provided for the controlling of the streets by the authorities; living in a new country induced the habit of allowing stock to run at large; as settlement increases sentiment changes; did not know whether this village was ready for the change or not; before bringing the matter to a test we should consider well the chances of success, for a failure would put us back several years; thought an educating process needed.

W. H. Hurlbut thought the policy of the State in permitting pioneers to pasture their stock at large, and giving powers to supervisors to curtail the privilege at the proper time a wise one; the country is yet two-thirds or three-fourths wild, but this town has come nearly to the changing point; the matter could be decided by village election or council; the number of cows now running in the street cannot live legitimately; might be allowed to run from May to September, but was tired of setting trees to feed cattle on when hay was \$10 per ton; owners of stock are liable to a heavy penalty for damage done; the law permits one-fourth of the road tax to be expended in setting trees; would recommend demanding and taking that right; would set large, high, fast growing trees for atmospherical influence, as they arrest and change the upper currents; wanted no low evergreens, but Lombardy poplar, ash, elm, and white pine; maple good, but short lived and subject to borer; had best success in transplanting pines in June; preferred to do away with fences as they made drifts, and drifts were a source of vexation.

T. T. Lyon said that in transplanting whitewood, white ash, basswood, etc., from the forest, he had trenches cut around them and filled with leaves a year previous to taking up; fibrous roots were formed, and trees 20 feet high which he cut back to 8 feet were moved without a single loss.

N. Phillips thought the European larch unrivalled for street planting; in Council Bluffs deeds required the setting of trees on each lot; was tired of shutting and shoveling gates from under snow drifts on account of cattle.

L. H. Bailey would set the beech for shade and fruit.

C. J. Monroe said that setting shade trees was his hobby for pecuniary reasons as well as æsthetic. A California law gave a dollar to the planter of every tree after four years; setting trees there is next in importance to irrigation; roads lined with trees in Iowa and Illinois add almost one-third to appearance and value of surroundings; we who are brought up in the woods do not appreciate them; we made a good beginning last spring in setting trees, but ought to do two or three times as much this year; it is a matter that will affect us a lifetime; if people would see the importance of it nothing need be said about cows; the quicker we act the better; our lake will take care of itself, but our forest will not.

Mr. Hurlbut mentioned a Department of France which, becoming sterile, Napoleon I. ordered the planting of a large pine forest, and now the region is fruitful and the people are returning. Spain was also cited as showing the blighting effects caused by denuding a country of its forests. Americans are destroying the best portions of this country in the same way.

J. G. Ramsdell considered fencing against cattle an expensive business; said that a row of maple trees was the turning scale in buying the place he owns, and would not take \$500 for them; original cost about \$1; had heard strangers speak of the street near Mr. Bailey's as being very handsome; we wanted a dozen or more such streets, and then we need not be ashamed to have strangers visit our place.

Monday Evening, March 19th.

The Society was called to order at the usual hour by President Bidwell. The small fruit list was taken from the table, and upon motion each variety as submitted by the committee was voted upon and adopted or rejected separately. Pending such action, the discussion upon their respective qualities was very full and animated—too extended for anything like a complete reproduction in this place. The selections were made with a view to market qualities—cash returns, which would necessarily embrace these features, viz.: hardness, productiveness, size, color, firmness and lastly *quality*. One or two members deplored the disposition among growers to ignore quality, or making it a secondary consideration and warning the Society that as the public taste is gradually becoming more cultivated and discriminating, our growers must give this feature more heed than heretofore, and not depend too implicitly on *looks* alone to make a sale.

Instances were cited of the unreliability of the market reports as regards sales of certain varieties, since it is a common thing for fruit of a second class variety to pass under the name of some well known or popular sort.

Strawberries.—The Wilson for all soils, and the Jucunda and 'Triumph for rich or heavy soils. The former is too well known to require description, and is unrivaled in all the points that go to make up a market berry. The two latter when planted on their favorite soil and kept trimmed in *hills* excel the Wilson in size, and the Triumph does in color and quality, but neither of them are so prolific—but as they often sell for double the price of the Wilson it pays to set them.

F. A. Wakefield was not in favor of commending the 'Triumph for general cultivation, as it was very susceptible to neglect and bore too sparingly.

J. G. Ramsdell's success with the Jucunda had also been indifferent.

The testimony of C. H. Wigglesworth, our most extensive grower, was strongly in favor of both. They demanded care, he gave it, and they repaid.

Red Raspberries.—The Kirtland and the Herstine were the two agreed upon after considerable discussion over others. The first is not so large as the latter, but comes on early and is a uniform bearer; does best grown in hills.

F. A. Wakefield urged that the Philadelphia be added to the list, but it was excluded on account of its color, size, and quality, though its productiveness and hardness were strong points in its favor. N. Phillips likened the Philadelphia to the Keswick Codling apple for general home cultivation. W. H. Hurlbut approved a limited list of first-class fruit, and that only.

Of blackcaps, the Doolittle and Mammoth Cluster were selected. T. T. Lyon asked whether it was worth while to consider the blackcap at all. C. H. Wigglesworth answered that they filled a space between the red raspberry and the blackberry, and some years were very greatly in demand.

Blackberries.—The Lawton was considered too tender, a poor shipper, and sour unless it hangs till too ripe for shipping. C. H. Wigglesworth said it was good for canning, and was not so liable to rot as other sorts. J. G. Ramsdell objected to its cob-like core. Both it and the Wilson were voted down and the Kittatinny only retained. This berry has been grown very successfully all around us.

Currants.—The Victoria and Black Naples were selected, and on motion of J. G. Ramsdell the White Grape was added.

Grapes.—Delaware and Concord. For a wine grape, W. H. Hurlbut recommended the Clinton. Those of red-ribbon proclivities objected.

Gooseberries.—Houghton Seedling and Mountain Seedling, though this berry is not recommended as a profitable crop.

Monday Evening, April 23.

The President being absent, Mr. Hurlbut took the chair.

G. L. Seaver asked if any of the members had been successful transplanting the hickory.

N. Phillips replied by advising to cut off the tap root during the summer and removing the tree the next spring.

W. H. Hurlbut said they could be removed if great care was taken to get the root.

C. H. Wigglesworth, being called upon to open the question for the evening, said he would plant the front yard all to grass and have no plants or flowers in it. It then requires no care. He presents his own place as an example.

R. Haigh agreed with him as to grass. Nothing gives greater satisfaction to the eye than a fine piece of lawn. This can be prepared much better before any planting is done. But we still need trees and shrubs. The planting should then be done with reference to cutting off all undesirable vines and leaving those that are pleasant to the eye, and the effect be studied both from interior and exterior. Care should also be used to avoid planting in rows, and having nearly equal distances between those that are planted at random. It should also be done in such a way as to conceal the boundaries, not by belts or rows of trees, but by such an arrangement of groups as shall partially hide the fence and break all sharp angles. Walks or drives should not have unnecessary curves. If one is desired a shrub or three should be so planted as to give the appearance of necessity for such a curve. He thought the subject one that deserves much more consideration than it receives, and that no one should own a piece of land that does not make an effort to improve it.

N. Phillips stated, as an instance of how little attention some men give to this question, that some one had placed three places in his charge for sale with not a tree planted on any, and yet the owner had lived here twenty-two years. His idea of planting was to scatter the trees at random all over the place, and should use plenty of evergreens. He spoke especially of barberry as a hedge plant, and thought it would be the plant most used for that purpose in the future.

The Secretary spoke strongly in favor of a fine lawn, and said that on a small place a piece of grass finely kept, and unbroken by plant or bed, had a most pleasing effect. He favored planting, but would rather put in groups near the corners and border. Would use trees of small growth in a small place, and a greater variety only where there is plenty of room, and use those that by peculiarity of form or leaf would be attractive a great part of the year. For this purpose he especially recommends the Kilmarnock and New American Willow, and Weeping Mountain Ash for weeping trees, and the Cut Leaved Birch, Golden Bark Ash and the evergreens as upright growers. Would never use an evergreen for a street tree, and on no account trim it up at the bottom. In all cases plant a tree with reference to its size years hence, and not judge it by the room it takes up at the time of planting.

Mr. Holcomb said he had given the subject considerable thought. He

believed that people made the mistake of planting without reference to the future more often than any other; many times putting out trees where in after years they were very undesirable. This very often occurred in planting evergreens.

W. H. Hurlbut said that a yard leveled and kept by pigs, and filled with sumac for ornamental trees, was the best he ever expected to have. Still he thought we might do better by trying, and if the attention of the people could be drawn in this direction it would be for the benefit of the locality.

Monday Evening, April 30.

W. H. Hurlbut opened the talk on the question for the evening by stating his first mistake was in not commencing soon enough at the business. He spent a good part of his life on a farm, yet did but little in fruit growing until he came to South Haven. Then he began without knowing what he wanted to do or how to do it, bought trees of agents and dealers, and obtained varieties not desirable, although avoiding the common mistake of having too many kinds. Thinks he made a great mistake by carrying too far the theory of heading in, both on the apple and peach, allowing forks to grow which caused the heads to become too thick and spoiled the fruit. The peach was very liable to do this. He believes in heading back, but it must be done in a judicious manner. Thinks he damaged his trees for several years by cultivating one year too late in the fall; also destroyed a large part of an orchard of young budded trees by plowing away from them very early in the spring, when there came a hard freeze afterwards. He hoped, through the aid of this society, to avoid any more such errors.

R. Haigh thought he had lost one crop by cultivating too much, but his greatest failure had been caused by not having his land drained enough.

The Secretary stated that a good deal of his experience in fruit growing had been in trying to rectify the mistakes, in planting and cultivating, of others, but by putting off draining one season had lost in value more trees than the draining afterwards cost, besides the loss of one year's time. His greater mistake had been in the nursery instead of the orchard.

J. G. Ramsdell believed his greatest error, and one committed by many others, was in trying to do too much,—trying to cultivate too much land with limited means, thereby not doing it well. Thought that even now he had too much land. Did not think it paid to try to do a little farming along with fruit growing with land worth as much as it is in this vicinity. Had made the mistake of planting too many varieties and wrong kinds. Thought it an error to plant only one kind of fruit. Had pruned in June, and although not always a mistake, did not deem it advisable.

N. Phillips said when he came here he bought rough land because it was cheap, rather than pay \$200 per acre for that ready to plant. He thought this the greatest mistake he ever made. The highest price land would be the cheapest in the end.

C. M. Sheffer began fruit growing by buying out an old nursery very cheap, then planted out everything without regard to variety and did not do it well. Then afterwards grew some peaches and put out seedlings as well as budded varieties because they were good looking trees. His greatest mistake was in not putting out 500 of about five good varieties. They would now be worth a fortune. He also waited too long before putting out a good peach orchard. Was

afraid of overstocking the market. Thought he must use all his means in clearing up a farm, but now he finds his fruit and not his farm his greatest source of profit.

Charles Gibson said he commenced fruit growing by letting others, tree-sellers, tell him how many and what kinds he wanted. Found that a great mistake. Then he followed that by setting out an orchard of seedling peaches; then waited too long before setting out good kinds. Had also lost a good deal by using too wet lands. All of these mistakes were the result of not knowing enough about the business.

The meeting brought out the fact that several of the members had committed almost the same errors, by not having the experience of others to teach them, or failing to profit by it. Many tried to do too much. Several planted wrong varieties, and on land not thoroughly prepared and drained. All present thought this telling our mistakes of great benefit to us. Owing to the importance of the subject, and the interest manifested, it was decided to continue it for another week, to be followed, if there is any time, by the other side,—"The most important success that each member has had while in the business."

Monday Evening, May 7.

The Society came to order with N. Phillips acting as president. As this Society has the fixing the date of the June meeting of the State Society to be held here, that matter was considered for a little time. On motion of Geo. L. Seaver the matter was left to a committee of three, the Secretary to act as chairman, the balance of the committee to be announced at the next meeting.

Geo. L. Seaver began the real talk of the evening by saying that his first effort toward fruit growing was to prepare new land upon which to put trees. It would have proved more profitable to have bought less and had it ready to plant. He would not again make the mistake of waiting till late in the season before buying his trees, as then often neither the variety or quality desired can be obtained. He thought he had injured the trees around his house by giving too good care, keeping clean and working among them too late in the season.

T. T. Lyon stated that he had planted a large orchard in which there were a great many varieties. Did not expect large profit, but did it to test the fruit. He succeeded well, but he believes his error was in thinking others who profited by his efforts would give him credit for what he had done, but they did not. He began by heading trees high, about six feet, but now usually started the head less than two. The trees are less liable to blow over. The trunks are not troubled with the borer, and in cherries it entirely prevented the cracking of the bark.

Henry Chatfield, like several others, thought it necessary to keep the ground clean the whole year, and so cultivated the whole year, injuring the trees. He thinks his greatest error was in not beginning sooner and more extensively.

One of the younger members thought his greatest error was in beginning at all. But nearly all the other members present regretted they had not began sooner.

J. Lannin began by planting 400 apples, but not knowing good from inferior trees, planted the latter, and as a result lost nearly all. He began again with pears, and has planted several hundred since of pear and peach, most of which have done well. They are not yet old enough to give much return, so cannot speak of the profit.

W. H. Hurlbut then gave his experience with pears. Had some trees in sod that bore and did well. Thought he would help them, so he cultivated, mulched and enriched them, but the result was to kill half of them by blight. Also did the same with some younger trees, with the same result. Thought his greatest success was with 2½ peach trees four years planted, from which he received over \$87, besides having all the fruit he needed to supply a family of seven to use and to dry. He has several times cleared more money from four acres of peaches than from his 80-acre farm near Bangor. Has no doubt there is more money in ten acres of peach orchard than in 160 grown in wheat.

C. M. Sheffer stated that he netted \$1,350 from 2½ acres of peaches in 1873. His fruit always pays him something, but he thinks there is no money in farming here.

Henry Chatfield said he had been very successful with his apple orchard, although he could not give any exact figures. Does not claim any great credit, as he thinks he happened to be fortunate in choice of location and varieties.

Monday, August 20.

The Society came to order with Vice President Ramsdell in the chair. A communication from C. J. Monroe was then read by the Secretary, and on motion of Mr. Dyckman, was laid on the table to be acted upon later in the evening.

The committee appointed at the last meeting to examine the peach orchards for yellows made their report, giving the names of the owners and the number of diseased trees found. They also reported that in most cases the trees had already been destroyed. Complaint was then made out against the others to the commissioners of the townships of South Haven and Casco, and they requested to examine the orchards and destroy the trees, as the law requires.

Mr. Healy said much neglect in the destroying of diseased trees arose from the belief that the yellows only spread when the trees were in bloom, and if the trees were taken out any time before spring no danger could result. He thought this idea a wrong one, as the disease spreads at any time.

A. S. Dyckman thought it very dangerous to allow the tree to stand after the disease showed itself. Nearly all the trees taken out of his orchard were near one or two that remained some time after becoming diseased, left because he did not then know the yellows. He believed it could be communicated by one tree rubbing upon another; or a person climbing from tree to tree in picking fruit might carry it. We could not be too careful, and should remove the trees on the least appearance of the disease.

The communication of C. J. Monroe was then taken up, and the resolutions offered by him were unanimously adopted. The Secretary was instructed to procure 500 copies of them for distribution.

On motion of H. J. Linderman the same subject was continued for next week.

The great interest taken in this matter was shown by the large attendance and the determination expressed by all to remove all traces of yellows from the orchards in this vicinity. The following are the resolutions passed by the Society:

To whom it may concern:

WHEREAS, It is currently reported that diseased peaches are being shipped from Michigan, to the great detriment of our good name; Therefore,

Resolved, That the South Haven Pomological Society make the following requests, to-wit:

1st, That every person in this community shall refrain from shipping diseased fruit;

2d, That managers of boat, railroad, express, or other transportation companies refuse to receive diseased fruit;

3d, That commission men or other dealers handling our fruit forward to this Society the name of any person shipping diseased fruit;

4th, That any person or persons who shall hereafter ship diseased fruit, knowingly, shall be prosecuted or otherwise dealt with, as the Society may dictate;

5th, That commission men and others selling our fruits will *report* and *quote* it as South Haven Fruit;

6th, That a copy of these requests be sent, as far as practical, to producers or shippers, managers of transportation, commission men, and others interested.

Resolved, That the South Haven Pomological Society hereby pledges itself to use its best endeavors to carry out the letter and spirit of the above requests, and *further*, that we will, by all legitimate means, insist that nothing but good, sound, healthy fruit, *honestly* put up and *truly* represented, shall be shipped from this locality, and we earnestly invite the hearty coöperation of all persons interested.

Monday Evening, Nov. 19th.

A very full attendance was present to take part in the discussion of, next to controlling the yellows, the most important question with which we have to deal. The Secretary opened by speaking of the immense crops now being taken from some of the orchards. From where was the supply of nutriment to come to enable the trees to keep bearing these crops? One very important source of manure was to keep stock and convert feed into manure to return to the soil, but many of the places here are so small that this is hardly feasible. But as far as it can be done it should by all means be employed. The sowing of crops to plow in has been highly recommended. We can do this very well when the trees are small, and grow a large amount to turn under, but then we do not need it. We may injure the trees very much by stimulating so highly at a time when they usually grow fast enough. But when the trees are large and the ground much shaded we cannot get a large growth, and this is the time the trees are called upon to supply material for the heavy crops. He heard this question discussed one evening by the ablest nurserymen and fruit growers of western New York, and their decision was that orchards could not be kept up by green manuring alone. He feared this would be the case here. One source of obtaining manure had been suggested to him that might prove of value, although he had been unable to look the matter up. Had been informed that large quantities were taken from Chicago and dumped into the lake and a good price paid to get it disposed of. If we could get that disposed of at a cost of not over a dollar a cord, no doubt it would prove a profitable investment. Could not say as this plan was feasible, but thought it might be worth looking up.

Stable or animal manure is preferable to any other kind, and should be procured in every way possible. The country here lacks the large muck beds that are found all over the State, and thus one great source of fertilizing material is cut off. He was brought up at a business that required great quantities of manure, and it had to be obtained in every possible manner, and to see such crops taken off as we get year after year, and little or no manure used, seemed to be the direct road to ruin for our orchards.

W. H. Hurlbut said he believed most of our land strong enough to grow crops of fruit ten or fifteen years with very little manure, but thought it a very poor plan. Our heavy lands could be kept up a good while by plowing in green crops, and was satisfied that plowing in three crops of rye on the light soil in his peach orchard had helped it very much. But our true course was to use all the stable manure possible, especially on the lighter lands. Thought we had better import feed and buy pigs and feed in the orchard, rather than import manure; the latter plan would pay, but the other would be cheaper. Had kept hogs the past season in part of his orchard and found their rooting cultivation enough. He fed them there, and directed their rooting by sowing a few oats around the trees. The fruit was larger, finer, and clear of insects. The hogs hunted the insects as well as the grain. Would keep them there the whole year, except a few weeks when the fruit was ripening.

Henry Chatfield found an application of coarse manure a great help to the trees. The fruit was larger and finer, but he did not see how we are to keep up the supply. Was satisfied the pigs in his orchard helped it very much, but they took all the fruit near the ground, even jumping up and shaking limbs.

J. Launin kept some young pigs during the summer among his old pear and peach trees. The fruit was very much improved and never had been so free of insects before. Thought they would injure trees headed low, as he expected to have all of his, for they ate the limbs as well as fruit. He spoke of one instance where a farm was brought up by growing peas and plowing them in; thought peas might be a good crop to grow to feed off and plow in.

C. T. Bryant found plowing in crops helped the trees very much, but did not think enough could be grown among large trees to keep up the soil. He had brought up some trees, nearly used up by the hard winter, by heavy applications of manure, but in one case where a good deal was applied, although the fruit was extra fine, a part rotted. He thought the dose too heavy.

F. A. Wakefield kept a pig among a few trees, and although the general result was very beneficial to the trees, the pig rooted one entirely out. Did not think we needed any manure on our young orchards: believed we grew them too fast now.

H. J. Edgell said he had tried to seed to clover for turning under, but had failed; found corn very good and thought buckwheat would be also.

W. H. Hurlbut said a crop to plow in must be one to grow in the fall or very early in the spring. During the late spring and summer the trees needed all the moisture, and a crop growing at that time did more harm than good for this reason: corn or buckwheat was not as good as rye. The latter grew well late, and in the spring by the middle of May was plenty large enough to make a good crop to plow under.

N. Phillips said the limbs taken from the trees were very valuable to return to the land; cut them up and plow in, and get others if possible. Men were paid 50 cents a load to haul away manure on the other side of the lake. It would be a very good thing if we could get some of it brought here.

THE SECRETARY'S PORTFOLIO.

THE SECRETARY'S PORTFOLIO.

INTRODUCTORY.

The interest in the Secretary's Portfolio, as published in the volumes for 1875 and 1876, has been so outspoken and satisfactory that I have concluded, in the volume for 1877, to give more attention to its compilation and classification. To this end I have been saving, during the entire year, the best things that have been said and written upon horticultural topics, that have come within my reading and conversations, believing that the readers of this volume will be glad to preserve them in this condensed and classified form for assistance.

I believe with an old friend, who has succeeded admirably as a fruit grower, that he who would succeed as a horticulturist must be in love with his profession; he must adopt it as his business, and identify it with his life. He must be a close observer, possess an indomitable will, and a large amount of patience and perseverance. He must be a man who has learned to labor and to wait—not to labor for a season to plant an orchard or vineyard, and then sit down and wait with folded hands, expecting without further effort to gain Pomona's fairest treasures; but to labor constantly and earnestly, believing that the reward will come; still I must add to this that it seems to me very many mistakes may be avoided, and better and surer progress made by reading the experience of our most successful horticulturists, from year to year, and preserving this experience where it shall be an aid to us whenever we most need it.

Again, our reports fall into the hands of very many who pursue horticulture as a pastime,—who desire to know all about the vocation as a matter of knowledge without regard to profit.

Of all the occupations of man, ours is the one which to him who desires it can find the best combination of activity and repose. Some one has said of it:

"It is not idleness; it is not stagnation; and yet it is perfect quietude. Like all things mortal, it has its failures and its disappointments, and there are some things hard to understand. But it is never without its rewards, and perhaps if there were nothing but successful cultivation the aggregate enjoyment would be less. It is better for the occasional shadows that come over the scene. The discipline, too, is most salutary. It tries our patience and it tries our faith. But even in the worst of seasons there is far more to reward and encourage than to dishearten and disappoint. There is no day of the year without something to afford tranquil pleasure to the cultivator of flowers, something on which the mind may rest,—rest with profit and delight."

I have had in mind this class of people who engage in horticulture, as well as those who, by the occupation, gain their support, and, while claiming little of originality and only a beginning in method, I still hope this abridgment of current thought, conversation, and experience may be pleasing and instructive to the readers of this volume.

In the arrangement of matter I have placed Horticultural experiments foremost, followed by various sections upon Pomology, to wit: Varieties and Cultivation; Pruning; Protection; Transplanting; Notes of State Orchard Committee; Controlling the Bearing Year; and the Preservation of Apples. Next in order I have placed Floriculture, with the following sections: Hints for the Flower Garden; Decorative Plants; Bedding Plants and Cut Flowers. The next division is devoted to the Vegetable Garden, followed by Insect Notes.

Succeeding these sections will be found the following order of general topics: Landscape Gardening; Arboriculture; In and About the House; and Scientific Horticultural Notes.

SECRETARY.

HORTICULTURAL EXPERIMENTS.

TRAINING THE GRAPE.

There is a considerable discussion among grape growers as to the relative value of long and short arm pruning of the grapevine, the question turning upon the quantity and quality of the fruit. Prof. W. J. Beal, who acted upon the Orchard Committee of the State Pomological Society this season, was quite interested in an experiment now being carried on by John Whittlesey, of St. Joseph, in which he is illustrating side by side the long and short arm systems. The following communications will be interesting as giving the results of Mr. Whittlesey's experiment at this date:

Charles W. Garfield:

DEAR SIR:—I received a note from Prof. Beal after his return home, requesting from me a statement of grapes in pounds taken from the vines with long arms, and also the pounds from short arms, occupying the same distance in feet of the long arm vines. I cannot give the amount in pounds, as I have not yet taken the grapes from the vines of either. I called on J. A. Donaldson, one of the most intelligent of our fruit growers, to make an examination of the two systems I am practicing in growing the grape. The result of his examination I herewith inclose. I observe he only has reported as to two vines with long arms, whereas I called his attention to one of 54 feet and one of 38 feet, which have the same good show of fruit and quality as the two he reported on.

JOHN WHITTLESEY.

St. Joseph.

The letter appended is the opinion of Mr. Donaldson.

John Whittlesey:

DEAR SIR:—In accordance with your request I examined some vines in your vineyard with a view to determine the relative merits of the long and short arm

system of training grapevines. In comparing one vine occupying fifty feet of trellis with others of the same age, as you state, occupying but eight feet of trellis each, I found the fruit on the former decidedly superior in size and perfectness of clusters, and I judge it would be safe to estimate the quantity fifty per cent greater than on the short arm vines. I noticed also that the short arm vines had a redundancy of wood, which the long arm vine was comparatively free from. You also called my attention to a vine with one arm four feet, the other twenty-four feet. On examination, I found the fruit on the short arm inferior in quantity and quality of cluster, while that of the long arm showed the same superiority that the fifty foot vine showed over the eight foot vines. Altogether, I think your experiments afford a good illustration of the advantages of gradually extending the vine instead of confining it to a few feet of space.

J. A. DONALDSON.

St. Joseph.

LOW HEADS FOR ORCHARDS.

Will you allow a short communication on the long and well discussed question of low or high headed apple trees, by one who has been experimenting on that subject for the last thirty-five years, and who has the egotism to think he was among the first who wrote on the subject of low heads for the prairie? There are three orchards of my planting in Jefferson county. The first was started with a few high headed trees in the spring of 1842. I found it so difficult to keep them from blowing about, and saw that those which had been planted a few years were all leaning to the northeast, and that the bark on the southwest side was most all killed, I concluded by cutting the heads low that they could be kept in position better, and would shade the body from the sun, and by practice I found my theory to be correct. In 1857 I changed farms and planted an addition to the orchard that was on the farm I bought. I started it with very low heads, say from 12 to 18 inches above ground. They are now strong, healthy trees, bear well, but are too low for convenience in gathering. Some six or seven years ago I cleared off a piece of timber land and started a young orchard of choice hardy varieties. I started the heads from 2 to 4 feet from the ground. After experimenting for the above length of time and taking all things into consideration, I have come to the conclusion that a medium height and proper pruning is perhaps the best and most convenient.—*Correspondent Prairie Farmer.*

INFLUENCE OF AGE ON LEAF AND FLOWER.

Decandolle, the celebrated Swiss botanist, has started a question which promises to be a very interesting one. Does a tree produce flowers or fruit earlier as its age increases, temperature and other circumstances remaining the same? He gives a number of observations to show that in some cases they do, and in other cases they do not, and botanists are in a quandary. It is generally found in these contradictory cases that there is a near reason, not discerned, that will explain the whole. It has been noted by American botanists (see Salem vol-

ume of "Proceedings of American Association") that trees of the strongest constitutions leaf the earliest. Thus there are varying times of leafing in Norway spruces, though both be of one age. In a severe winter, if one or two such die, it will be the one which leafs the latest. The early one is the hardiest. Now a young tree is always more tender than one approaching a flowering condition. Young trees are often destroyed when older ones escape. This being the case, there would be a difference in the time of leafing between such young ones and their elders. On the other hand, where young trees had as strong a constitution as older ones, and there may be many such cases, there would be little difference.

WHERE DOES THE SAP WINTER?

The generally accepted theory in regard to the circulation of sap in trees is that it flows down from the limbs to the roots in the autumn, where it remains for the winter. In the spring it flows upward to the limbs again, to aid in the reproduction of leaves, blossoms, and fruit. I do not know that I have ever heard this theory disputed, until recently. But now it has not only been disputed, but proved false by experiments made at the Massachusetts Agricultural College.

The experiments were as follows: In December a maple tree was cut off near the bottom, and still so fastened that it remained upright. The trunk was sealed over with wax. Thus the tree stood until spring, when it was topped, and the result was the sap flowed as freely as from other trees, which had not been cut off. Of course the sap in this case could not flow from the roots, as the tree had been entirely cut off for several months. It must have come directly from the body and limbs, and hence it must have remained there all winter.

Another experiment: A young maple was cut in the winter, and carried into the greenhouse, and after it had "thawed out" it was topped. The sap at once began to flow, and continued for thirty-six hours. The tree was then taken out and allowed to freeze again. Upon being carried back into the warm greenhouse, the sap resumed its flow, and continued to do so as long as the freezing and thawing processes were kept up. This experiment confirms the fact established by the other just related, that the sap of trees does not winter in the roots, but in the tree as a whole, and in every part of it: and that the freezing and thawing are the only conditions of preventing and causing the sap to run.

One more experiment should be tried, if it has not been, viz.: to top the roots of the tree in the spring, after the trunk has been removed. I have no doubt it would be found that the sap would flow as freely from the roots as from the trunk. The following fact would seem to substantiate this opinion. Last March a yellow birch tree was cut in the woods, in the process of gathering fuel. And it was observed a month later that the sap flowed from the *stump* copiously. This fact alone would go to prove the old theory that the sap of trees winters in the roots; but the other experiments above cited, show that it winters also in the body and limbs.

On the whole, we are forced to the conclusion, that the old theory is false, and that the sap of every tree permeates the branches, body and roots, in the

dormant state, and that it circulates freely only at a certain temperature, after it has been relieved from its icy bondage. As the tree thaws out the sap is set in motion, the freezing nights being as essential to its flow as the thawing day-times. Any further questions in regard to the philosophy of sap-flow or sap-rest, I decline to answer just now.—*Western Farm Journal*.

EXPERIMENT WITH SEEDS.

There are many questions constantly presenting themselves for solution to every thoughtful person engaged in the propagation or cultivation of plants. These questions relate to all the infinitely varied conditions and influences under which plant-growth can take place. Every farmer and gardener has many opportunities to throw light on these subjects by a little effort in the way of experimenting. The whole future life of the plant is often greatly influenced by the conditions under which germination takes place. The condition and quality of the soil, the nature, condition, and amount of manure or fertilizer used, and the conditions of light, heat, and moisture during the germination and early stages of the plant, have a decided and in most cases a controlling influence on the future growth and vigor of the plant. These things are all governed by established laws. The reason that success is not more general and uniform is that our knowledge of the laws of germination and growth is too limited, and even what is known is not as generally and intelligently applied as it might and should be. A simple, carefully conducted experiment, in which all the known elements are taken into the account, may be the means of throwing light on some important point that will result in great practical good. Soaking seed in various mineral or chemical solutions before planting, often has a very important effect on the health and vigor of plants.

A series of trials that would determine what these effects are, would be of great practical utility to farmers. Would it not be a good subject for the consideration of Granges and Farmers' Clubs? Suppose the different members of a Grange should arrange for a series of experiments to be made during the present season, so arranging it that each one shall have a definite and specific duty to perform; every step in the process, with the results, to be reported to the Grange at the proper time. These reports might be placed on the records of the Grange for future reference, and thus serve as a guide to future operations.—*Correspondent Country Gentleman*.

AN EXPERIMENT IN GRAPE CULTURE.

Seven years ago, in grubbing up a Catawba vineyard, the writer left one row of the vines. The stakes had been taken away, and as a lot of apple tree trimmings were convenient, a quantity were placed on each side for the vines to run on, just keeping them off the ground, but scarcely more than a foot from it in any place.

The experiment has been completely successful. The last three years have been excessively wet, and both rot and grape curculio have run riot among the

Concords, while these vines are altogether exempt. This year hot, steamy weather would occur immediately after severe showers. The result has been wide-spread blight among pear, apple, and other trees, and grapes could be seen to mildew while observing them; but these vines, close to the ground, have been kept shaded all the time and were also much cooler. In no case do they show any evidence of atmospheric or insect injury of any sort.

Experiments like these are recommended in localities where mildew is common, and where choice sorts, like the Catawba, do not usually prosper. The mode of culture has many merits. It costs little or nothing to care for them, only placing brush or rough forks under them to keep the vines from contact with the earth. In winter the snow, leaves, and other sheltering cover, sift in among the branches and remain there, preventing injury from severity of the climate. Last and most important of all, the fruit is of a superior quality, without any imperfections, in any part, even while requiring no care.

Have any of your readers ever tried this method of grape culture? If they have, it would be instructive to hear from them, whether they succeeded or failed.—*T., in Prairie Farmer.*

DETERIORATION OF VARIETIES.

Those who propagate from inferior seed or inferior stock, may expect to see "varieties run out." Those who use mature and healthy stock or seed, can rely on keeping up the variety they breed or grow from. Those who select extra specimens to perpetuate the variety, may look for improvement.

These rules are laws of nature. If they show exceptions that are not the result of bad treatment or accident, the exceptions will prove very rare and establish the rule. The one fast trotter, from plow-horse stock, does not convince anybody that horses for the course are hereafter to be bred from scrub stock.

I planted, last season, a few hills of "Stowell" corn from an ear that was partially matured. Some of it grew, but the plants were weak, and the small ears produced were much later than those produced from plump full-grown seed. Shrunken grain may grow and produce a crop, but the yield must be small and the grain inferior. And if the best of seed be used on weak soil, or with bad culture, or if the crop be injured by drouth, or shrunken by mildew or rust, such a crop is unfit for seed. With the best care in the best soil, it will produce weak plants. It has started already to "run out."

In grafting, I have found unmistakably more vigorous growth from scions that were large, mature, and with strong eyes, than from those that were not well matured or were of stunted growth; and doubtless the same is true of cuttings of all sorts when used for propagation. And thrifty trees and vines can be relied on to produce the best fruit, and (quality and quantity considered) fruit of the most value.

New varieties are produced by seed, and plants; and desirable varieties can't be perpetuated without care. Those that are reproduced by seed only, require care to avoid mixture and care to use only the best mature seed at that; and where cuttings are used for reproduction the healthy and mature alone are fit for use.

In the past, most tree fruit improvements have resulted from chance. Apple seed seldom reproduces a variety. The Strawberry apple, the Northern Spy, and the Crabs, come nearest to it, and seedlings from these give largest promise

of desirable new varieties. With peaches, pears, plums, cherries, etc., the chances for valuable seedlings are better, though real improvements seldom occur, and when we get a new variety worth perpetuating, it is almost always traceable to some choice old fruit.

Within the past twenty-five years, large attention has been paid to improving our out-door grapes. This effort has been mostly diverted to crossing or hybridizing the native vine with exotics and foreign varieties; and yet among the host of "promising" hybrids that have been introduced, there is not one to-day that has earned a vineyard reputation anywhere except in peculiarly protected nooks.

In the grape line, I have been experimenting with *breeding up* pure unmixed native seedlings. I have started a pedigree:

Native Fox produced Isabella; Isabella produced Eureka; Eureka produced Folsom's Centennial. With Isabella, every one is acquainted.

Eureka won a diploma in 1874, at our local fair, in comparison with Isabella as being "earlier, hardier, healthier, better keeper, better flavor, with fewer seeds, tenderer pulp, richer aroma,—and in no point inferior."

Centennial won a diploma at its first exhibition in 1876, as excelling Eureka in flavor and equaling it in keeping and in all other merits, with no demerit as an offset. I am growing some seedlings from Centennial. No plants of either yet for sale.

Of vegetable improvements from breeding up and using choicest seed, I would cite Dreer's Improved Lima beans, Hathaway's Excelsior tomato, and the host of potatoes that follow and claim to outrank the Early Rose.

The object of this article is to invite improvement in varieties, and to stop their "running out." What has been done can be done. There is still room for improvement, in animals and in vegetables, in fruits and in grains, in the dairyman's pasture and in the amateur's floral hosts of odor and beauty.

Inventors have a protected property in their brain-work and skill; authors copyright their books; but originators of new plants and fruits are not encouraged. And why not?

S. FOLSOM.

Eureka Place, Attica, N. Y.

VARIETIES AND CULTIVATION.

CRANBERRY CULTURE IN OTTAWA COUNTY.

During the discussion on irrigation at the South Haven meeting of the State Pomological Society in June, I took occasion to call the attention of the Society to the swamp lands within fifteen miles of the lake shore as particularly well adapted for the cheapest modes of irrigation, viz.: by damming. I also referred to the natural growth of cranberries found on these lands, and intimated that a development of these swamps for the growth of berries requiring irrigation would result in great wealth to the State. I now have the pleasure of detailing the experiments made by an old and respected citizen of

Ottawa county, who was formerly, in "the good old democratic times," I believe, Judge of Probate of the county. I refer to Hon. Grosvenor Reed, of Robinson. Mr. Reed has a farm on the border of what is known here as the "big marsh." It is a level wet prairie about nine miles east of Lake Michigan, and about seven miles long by about three miles wide. It is traversed by the Chicago & Michigan Lake Shore Railroad, and crossed by the graded line of the Michigan & Ohio Railroad, which being "caught by the panic" is still without rails. But the effect of these railroads on the marsh has been to cut through the banks and let out some of the superabundant water which the beaver dams have kept up. The body of the marsh has generally been used for cutting marsh hay, and since the railroads have been built, some efforts have been made to introduce timothy and clover, with success proportioned to the thoroughness of the drainage.

THE EXPERIMENT WITH CRANBERRIES

was made carefully by Mr. Reed on a piece of this marsh, 50x100 feet. About five years ago Mr. Reed prepared this soil by draining and growing a crop of potatoes, so as to kill the grass and weeds. The next year he plowed it with a sub-soil plow, throwing a portion of the sand sub-soil to the surface, so that the top became covered with sand, the main soil below being a peaty black muck. Mr. Reed then selected from the wild patches the cranberry plants that had borne the best berries during the season and planted them on his 50x100 feet lot. The result was the plants grew well and rewarded his labor with a crop of twenty-five bushels of excellent cranberries, being at the rate of $217\frac{1}{2}$ bushels to the acre.

Mr. Reed allows the water to stand on his cranberry patch during the winter, so as to protect the plants from frost, but does not raise the water in the summer, as it might overflow other lands required for other purposes.

Since the first crop a fire has gone over the marsh, sweeping the cranberries off one year, but this year, and at the time of writing, the cranberries exhibit a perfect sheet of white blossoms, showing that the fire did not destroy the roots of the plants.

Mr. Reed has planted half an acre with cranberries in the same manner, and the plants, although young, are also white with blossoms and show a promise of a good crop, say in all 40 bushels.

The land on which the cranberries are grown is high and dry enough, and has buckwheat and millet growing on the same level, which is probably about 15 to 20 feet above lake and river water level, and therefore easily drained. Mr. Geo. Eastman has 200 acres of it in timothy and clover.

In gathering the plants Mr. Reed selects them from the best natural patches in the fall, ties them in bundles, and puts them into water, where they remain fresh all winter, and he plants them out in the spring.

There are thousands of acres of this marsh and swamp land where the sand subsoil furnishes the requisite sand mulching by the use of the subsoil plow.

I understand gentlemen of capital have recently visited the locality, and that the big marsh is likely to become, instead of a source of malaria, a source of fruit and farm crops in profitable abundance.

Grand Haven, July 16th, 1877.

HENRY S. CLUBB.

THE STRAWBERRY FOR CHILDREN.

The old monthly Red Alpine is really the children's strawberry, on account of its perpetual character, the first berries ripening before the earliest annual sorts, and continuing until checked by cold weather in the fall. Although no great amount of fruit can be obtained from the plants at any one time, still, if put upon good soil, a moderate supply of fruit may be had every day during the summer. The berries are of a mild flavor, and always an acceptable dish to children, with whom good fruit is "always in season." For twenty years we have kept our beds of Alpine Monthly strawberries in order, and value them perhaps as much for old acquaintance sake as for the fruit; still, the latter annually affords us opportunities of giving the young folks, if not the older ones, many an agreeable surprise. There are four varieties of these Monthly Alpines in cultivation—a red, and a white Bush Alpine, which produce no runners, and two of the same kinds, producing runners the same as more common sorts. Near large cities and where the cultivator has facilities for irrigation, these perpetual strawberries might be cultivated quite extensively and with profit.

During the hot, dry weather of July and August, the berries are generally quite small, and not very abundant; but by applying water artificially, this decrease would be avoided. An occasional application of liquid manure would also tend to increase the yield and size; but all this is so well understood by strawberry growers that further remarks on the plant are probably unnecessary.—*Rural New Yorker*.

MANURING AN ORCHARD.

The following is an extract from Harris' "Walks and Talks," in Boston Cultivator.

"It looks as though we were going to have a short crop of apples this year," said the Deacon. "The trees have very few blossoms on them."

"Such is probably the case," said I, "and yet my Northern-Spy orchard seems to have full as many blossoms as last year. If I get a crop this year I shall begin to think that my method of managing the orchard is not a bad one. It is now about ten years since this orchard was plowed. It has been pastured by sheep and hogs, and been moderately top-dressed with manure occasionally. It produces an enormous amount of grass, and, as nothing is removed except the small amount of plant-feed in the apples and in the milk, flesh and bones of the animals, and as the sheep and pigs get more or less extra food, and we top-dress the orchard in the bargain, it cannot be but that the soil is growing richer and richer."

"But would it not be cheaper," asked the Doctor, "to keep the land fallow and let the trees have all the plant-food annually developed in the soil?"

"As a rule," said I, "such is undoubtedly the case. But this Northern-Spy orchard unfortunately is planted on light, sandy soil; and, as we all know, there is little to be gained by working or fallowing such land. An orchard on a clayey soil would be greatly benefited by being kept fallow and by plowing early in the spring and late in the fall, and by keeping the surface loose and mellow during the summer by the frequent use of the cultivator and harrow. Working

the land would develop the plant-food lying dormant in the soil and render it soluble, and the rains would carry it down to the roots of the trees. But on this sandy soil I think it is necessary to manure the orchard. If this is done then it would make very little difference in the end whether the land was kept in bare fallow or in pasture. But I am getting on to controverted ground, and the weather is too hot, and we are all too busy to indulge in a discussion of this nature."

ANOTHER UPON THE SAME TOPIC.

I have read with interest the notice in your issue of the 19th, by "Free Talker," of one of the meetings of the Pomological Society where the necessity of a system of fertilization of orchards was broached, especially of the orchards of the Michigan Lake Shore, where the soil is of a silicious character. This matter of enriching orchards has been for some years a subject of some thought with me. At length I came to the conclusion to make an attempt in that direction on about ten acres of apple orchard. In the spring of 1876 I plowed the ground as deep as I could, then sowed one bushel of clover seed, and dragged it in both ways; this was in April. We had an abundance of rain at the time the seed was sown and afterwards; the consequence was a good catch. The clover grew all the season without pasturing. At this time of writing, it would be called a heavy crop. I am having it mowed with a scythe. As soon as it is cut I have it raked under each tree as far as the limbs spread. This I leave as mulch; the second crop I intend to let grow the balance of the season, ripen the seed and thereby restock the land. In 1878 I think there will be a heavy crop of clover. If so, I shall pursue the same course of mowing and mulching. The second growth of '78, at a proper time in the fall, I shall plow under. Thus I shall return to the land two heavy crops in the shape of mulch, and one, green, plowed under. This will be a cheap and durable way to enrich our orchards.—*J. Whittlesey, in Michigan Farmer.*

St. Joseph, June 20th, 1877.

THE RICHARD'S SWEETING APPLE.

On my father's farm, in the town of Prospect, Connecticut, were a few trees bearing an apple of the above name. The tree was a thrifty, upright grower like the Northern Spy but more stocky; fruit large, conical, and green, becoming yellow towards spring, at which time it was in its greatest perfection; flesh very firm and solid; skin remarkably smooth and a little oily after lying on the ground; flavor a very rich sweet and a little spicy. I left the farm fifty years ago, have never seen it, or a specimen of the apple since. Although I have looked for it at all the fairs I have attended for the past thirty-five years, examined every list of apples I could, and all the descriptions of winter sweets, yet I have failed hitherto to see it or hear of it. Knowing no residents now of the town of Prospect, and determined, if possible, to procure scions of what I considered the most valuable winter-sweet apple ever raised, I wrote to a cousin in

Cheshire who at first did not know the fruit, but after inquiry in his neighborhood he sent me scions of what he thought must be the tree I meant. These all failed, but a second lot were successful, and after having them set on three different farms, and waiting with much anxiety and impatience the time when I should excite much astonishment by the exhibition of the fruit, they at last bore the Ladies' Sweet described by Downing. It was not so bad as it might have been, but by no means satisfactory. Again, I have grafts from scions sent me in 1865, from Prospect. The tree from which they were cut is said to be known as the Richard's Sweeting, and the donor says it answers my description, and if, when it bears it fills my bill, pomologists will hear from it, otherwise I shall hold my peace. But in the mean time, as the grafts were set in young trees and I am getting old and impatient, I concluded to advertise for it in this manner. No apple with any stripes or splashes need apply, nor one of any other color than lightish green and yellow. I think I should know it among a thousand by its looks or taste.

Muskegon, Michigan, August, 1877.

S. B. PECK.

THE YELLOW TRANSPARENT APPLE.

Dr. Hoskins, of Newport, thus describes this acquisition from Russia.

The Yellow Transparent is a Russian apple, like the Tetofsky, Duchess of Oldenburgh, and Red Astrachan, which was raised from scions sent out by the Agricultural Department in 1870. Dr. Hoskins of Newport describes it as it has grown in Vermont as follows:

"It is an extremely early bearer, giving fruit the third year from grafting on a seedling root, and is now bearing its third crop, consisting of over a bushel. The tree, notwithstanding its productiveness, is a free grower, being now some eight feet high. It is also an erect grower, and bears its fruit on short spurs close to the main branches, so that it can carry a heavy crop when small, without breaking down. Though so full of fruit that there seems to be more apples than leaves, yet the branches are not bent down at all.

In size, the Yellow Transparent apple is a full medium, round-ovate in form, straw-yellow in color, with an extremely melting, juicy flesh of delicate sub-acid, but not very high flavor. It is very fair, uniform in size, and its chief merit in our eyes, aside from its perfect hardness and early and abundant bearing, is that it is the earliest dessert apple we know. It begins to come into eating by the first of August, and the bulk of the crop is just now (August 10) ripening up. It will not keep long, soon becoming mealy and cracking open after reaching maturity. But for a home apple, or to sell direct to consumers in a near market, it cannot be surpassed, and its waxen beauty and fairness, together with its acceptable flavor, will make it a favorite wherever grown. It is about two weeks earlier than Tetofsky, and, if it had been introduced first, we doubt if the Tetofsky would ever have been heard of. Yet the Tetofsky is not to be despised, and we are glad that we have both."

THE TALMAN SWEET APPLE.

If I could have but one variety of apple, I would say give me the Talman Sweet. Twenty years ago, I set out my first orchard containing eighty trees of some half dozen different varieties. There were Baldwins, Northern Spys, Talman Sweets, besides some other kinds which were not labeled. Of that orchard I have now 13 trees left; they are all Talman Sweets, and all bearing fruit this year. Some of the others died before bearing fruit, others after bearing a few years. The Talmans have borne nearly every year for more than ten years. I think it was four years ago that I picked over eighty bushels of fine fruit from the thirteen trees in one season. So much for hardiness and productiveness. For a market apple I know of none more salable, especially where the people are educated up to using it. For home use I can think of nothing more delicious than a dish of baked Talman Sweets, and for eating in their season, they will fill the bill every time. As for feeding to stock, we have not come to that yet.—*J. R., in Rural New Yorker.*

AN ORCHARD OF 1,000 TREES.

The following question was sent me by Mr. Mitchell, of Jackson:

“What varieties shall I plant in an orchard of 1,000 trees for market purposes? Location—rolling ground just outside of Jackson; soil—gravel loam; altitude—high; drainage—good; allowing sufficient number of trees in the whole number for ordinary use in a family.”

The question was submitted to two men, who have had a considerable experience in fruit growing, and who have given especial attention to the adaptation of varieties for special localities and for special purposes: the one a resident of Grand Traverse county, the other of Kent county. The two lists were prepared separately, and these are herewith given because of the remarkable similarity. The names of the apples and the number of each sort to be used in a plantation of 1,000 trees are given below, and as the parties giving the lists wish their names withheld, we simply give the locality of each:

GRAND TRAVERSE LIST.	No.	KENT LIST.	No.
Red Astrachan.....	30	Red Astrachan.....	25
Famense.....	20	Famense.....	25
Maiden's Blush.....	20	Maiden's Blush.....	25
Red Canada (top graft).....	250	Cayuga Red Streak.....	25
Northern Spy.....	250	Red Canada (top graft).....	250
Jonathan.....	100	Northern Spy.....	250
Wagener.....	100	Wagener.....	100
Baldwin.....	100	Jonathan.....	100
R. I. Greening.....	50	Baldwin.....	100
Hubbardston Non-such.....	50	R. I. Greening.....	50
Family use variety.....	30	Home use variety.....	50

C. W. G.

QUINCE CULTIVATION.

The quince is rarely reckoned ornamental, and as grown in neglected clumps surrounded by suckers, and with misshapen and unpruned top, there is scarcely anything more unsightly. In this shape, too, it is less profitable,—the fruit is not fair and not so great in quantity as where the tree is cultivated and pruned. I suspect that it is because I have found quinces profitable that I think them so beautiful. For years a small clump in one corner of the garden has yielded me from 10 to 15 bushels annually, and if a farmer had only a few acres in this fruit, he need wish no better or surer income. At eight feet apart each way, 680 will grow on an acre, and this is close enough. I have often grown a half bushel per tree, and on trees in full bearing there should be an average of at least that. This would make more than 300 bushels per acre, and for years I have never sold any for less than \$2 a bushel,—some seasons getting \$3. I do not know any fruit which will yield a sure crop every year with as little labor as the quince. The sale of the fruit is not the only profit from this crop. Every year a multitude of sprouts will start up around the trees, and these may be transplanted to extend the orchard. Quinces begin to bear in from three to four years after planting these suckers, and every year the crop increases. Thus the farmer who has made a beginning in quince growing has the material in his own hands for increasing his plantation without any expense but the labor of transplanting.

One word of caution may be needed. In some sections the quince is not entirely hardy, or from some cause will not thrive well. It is always better to plant a few at first, and extend the plantation as the profit seems to warrant.—*Prairie Farmer.*

PEARS FOR HOME USE.

We are indebted to that veteran pomologist, John J. Thomas, for the following valuable article upon the above topic:

Land-owners who plant pears extensively for market, and who understand their business well enough to make such plantings turn to profit, will be likely to know what months will bring the best returns, and they will therefore not need much assistance in making out a market list. But there is a large multitude who have given less attention to the general subject, and who desire to set out a few dozen trees for their own family supply. They do not want the best sorts merely, but such a selection as shall give continuous fresh fruit for as long a period as may be practicable. In the Northern States, this period may be easily made to extend from midsummer to midwinter, or over six months; and by the possession of well-constructed and well-managed fruit rooms, the time may be much prolonged.

To assist in making such a selection for a regular succession, we give, in the accompanying list of forty-six sorts (which includes nearly all the most popular varieties), the time of the ripening of each in the Northern States. There will be some variation in these times in different localities and under the influence of varying soils, and in some instances the periods given may be slightly reversed with those which ripen nearly together. The winter varieties will vary much

with the degree of maturity they have attained on the tree, and the degrees of coolness in the temperature of the rooms in which they are kept; but as a general approximation to the periods of maturity, and more especially to the order of succession, the list will be likely to be more useful:

RELATIVE TIME OF RIPENING OF PEARS.

July.	August.	Septemb'r.	October.	Novemb'r.	December.	January.	February.	March.	April.
Sum. Doyenne. Mateline.			Ant. Paradise. Bosc.			Jos. de Malines. Prince's St. Germain.			
		Seckel.	Diel.				Alençon.		
	Rostiezer.		Dix.						
	Giffard.		Comice.		Columbia.		Easter Beurre.		
	Brandywine.		Angouleme.						
	Clapp.		Louise Bonne.		Winkfield.				
	Bartlett.		Onondaga.		Passe Colmar.				
	Tyson.		Urbaniste.		Lawrence.				
	Bloodgood.	Belle Luerative.							
	Dearborn.		Anjou.						
Osbond.			Superfin		Nelis.				
	Ott.	Buffum.							
	Boussock.			Clairgeau.					
	Flemish Beauty.			Black Worcester.					
	Howell.			Catillac.					
	Washington.			Glout Moreau.					
		Sheldon.		Pound.					
		Genesee.							

RIPENING OF PEARS AT THE SOUTH.

May.	June.	July.	August.	September.	October.	November.
	Giffard.			Superfin.		
	Doyenne d'Ete.	Rostiezer.		Beurre Diel.		
		Kingsessing.		Anjou.		
		Bartlett.			Lawrence.	
		Belle Luerative.			Winter Nelis.	
		Seckel.			Glout Moreau.	
		Flem. Beauty.			Easter Beurre.	
		Angouleme.				

SHALL WE LOOK TO QUALITY?

The tendency of awarding committees is to give premiums for good looks or great size, and the people are not so much to blame after all for showing great cabbages, squashes; in truth, vegetables and fruits of all kinds at the fairs. They get premiums on size and color, and premiums are what most exhibitors come to fairs for.

But are we doing right in stimulating this tendency rather than awakening a desire to look at the quality of productions. A. B. Gulley, of the Agricultural College, in commenting on vegetables shown in such profusion at the fair, said: "It is a grand show from the soil, but for my own use, I don't want any of it. The big things of the garden are always the most insipid, and in keeping qualities, always inferior."

It would be well for us to take some measures for getting at the comparative worth of large and medium sized productions before awarding a prize, thus leading popular opinion toward a consideration of quality.

At the State Fair one collection of apples was commented upon by every one passing as being the most beautiful upon exhibition. The collection only took the third prize, because the awarding committee insisted upon giving a premium upon quality. This committee was censured, but they knew they were right and some time this decision of theirs will be looked upon as a step in the right direction. It is impossible to guess with any exactness the pulp before the peel is cut, and we commend the purpose of any judges who go inside the fruit to help in the decision.

October, 1877.

S. Q. LENT.

THE USE OF APPLES.

With us the use of the apple, as an article of food, is far underrated. Besides containing a large amount of sugar, mucilage and other nutritive matter, apples contain vegetable acids, aromatic qualities, etc., which act powerfully in the capacity of refrigerants, tonics, and antiseptics, and when freely used at the season of mellow ripeness they prevent debility, indigestion, and avert, without doubt, many of the "ills that flesh is heir to." The operatives of Cornwall, England, consider ripe apples nearly as nourishing as bread, and far more so than potatoes. In the year 1801—which was a year of much scarcity—apples, instead of being converted into cider, were sold to the poor, and the laborers asserted that they could "stand their work" on baked apples without meat; whereas a potato diet required either meat or some other substantial nutriment. The French and Germans use apples extensively: so do the inhabitants of all European nations. The laborers depend upon them as an article of food, and frequently make a dinner of sliced apples and bread. There is no fruit cooked in as many different ways in our country as apples, nor is there any fruit whose value as an article of nutriment, is as great and so little appreciated.

PRUNING.

COAL TAR IN PRUNING.

I have practiced for seven years applying coal tar where large limbs were taken off, and I cut one that was fifteen inches at the place of cutting (for I always cut so close as to wound the enlargement that surrounds all limbs where they grow out). The tar is applied immediately with a paddle and rubbed till it thoroughly adheres all over the wound to the outer edge of the bark, taking care not to get it on the outside of the bark for it will kill in that case. The second or third year another application is made, *i. e.*, when any checks begin to show. In this case a roll of growth and new glossy bark, one and a half inches in diameter is traveling towards the center, having got one third of the distance, and no check or sign of decay is to be seen. I always keep a 100-pound paint keg of coal tar on hand for dressing wounds on trees, and I have seen no ill effects from its frequent use. Limbs thus cut and tarred will grow over without producing any bunch or unevenness. S. W.

PRUNING GRAPE VINES IN SUMMER.

Grape vines are managed in summer in different ways by different men: and when one has read the various methods of summer pruning, published in the agricultural papers, he finds the opinions of grape growers so various that he is merely befogged by them, if he is a novice in the business. Even the books published on grape culture are of little value, as they were written from fifteen to twenty years ago, and when our ideas on grape-growing were very crude. I will state a few points that twenty-five years' experience have proved to me to be correct, as follows:

1. Thrifty vines, as the Concord, Hartford Prolific, and other vines of very free growth, should have trellises, ten or twelve feet high, in order to obtain the greatest amount of fruit, after the vines have fruited four or five years; and the summer pruning should consist in cutting away feeble shoots wherever found, thus throwing the vitality of the vines into the stronger canes, which will produce the fruit buds of the next season.

2. Pinching back bearing canes to within a leaf or two of the nearest bunches is of no benefit to the fruit, as the leaves of the canes are the lungs of the vines; and I claim if the vines be shortened in at all, it should be done very moderately, merely stopping the further growth of canes by pinching them off near their ends.

3. In no case should the most thrifty canes be shortened during the summer, as they will be the canes which bear the next year's fruit.

4. As the fruit begins to turn in color, do not remove any leaves to expose the grapes to the sun, as they ripen no sooner by so doing, and the effect of the sun is injurious rather than beneficial, while the removal of the leaves actually retards the ripening of the grapes, by checking the flow of sap through

the canes, which the leaves regulate according to the requirements of the growing fruit.

5. To produce the best fruit, and in perfection, the small clusters of grapes, when the vines set a great deal of fruit, must be cut or pinched off, leaving but one bunch generally to each shoot or cane. Many vines are often so productive that it is impossible for the roots to afford full sustenance to the entire crop; and in such cases I remove about one half, always leaving the largest bunches, and the result is splendid fruit, while that on vines not so served is of much less value.—*Farmer's Friend*.

ROOT PRUNING.

For promoting the fertility of fruit trees, root-pruning is an operation now generally resorted to. If properly carried out, it is perhaps the most certain way to reduce a luxuriant tree to a fruitful state. We wish to emphasize the word *properly*, because it is quite as possible by root-pruning to reduce a tree to a state of permanent sterility as to make it fruitful. Fruitfulness in trees of luxuriant habit, such as apples, pears, and plums, and, in fact, in all other trees, depends upon that balance of force between the roots and the branches which, while it insures sufficient force in the branch, at the same time promotes the complete maturation of the wood, and thus the formation of flower buds. To hit the happy medium, to so balance the forces of the tree that fertility shall be attained without merging either luxuriance or weakness, constitutes the success of the careful cultivator. If, however, trees are planted, and, as is frequently the case with the amateur cultivator, are allowed to grow on and on for years, with the expectation that they will grow into fruit, the cultivator must not be surprised, if root pruning is resorted to, and not very carefully carried out, to find his tree thrown into a state of unfruitfulness,—sterile, in fact, until such a time as sufficient force is again accumulated to form healthy growth. Fortunately, however, our leading nurserymen are so particular in the stocks they make use of, and resort so systematically to root pruning and transplanting, that it is only by bad management after the plant leaves the nursery that the balance of force will be disturbed. Such disappointments, however, do occur, and generally result from mistaken kindness in using rich soils and manures. When the luxuriant habit is induced, the wood formed is too strong and sappy to form flower buds, and hence barrenness is the result. This may arise from over-rich soil, or from one or more roots rushing away deep into the sub-soil, where they suck up such crude matter that growth is promoted late into the autumn instead of being brought into the maturing state not later than the middle of August. With the luxuriant tree, and when the luxuriance is the result of over-seeding for a series of years, the best plan will be found to lift it out carefully from the place in which it has been growing, to shorten the strongest roots, and to plant it again almost upon the surface of the ground, using a little fresh soil around the roots, and mulching the surface of the ground with some spent dung or leaf mould. Carefully staked to prevent wind-waving, and the branches judiciously thinned out in early spring, and those retained shortened back, such a tree will be moderated in its growth the following season, and will almost invariably produce abundance of fruit buds. But if the check be too great, sterility may be the result for a year or two, which sterility will be more quickly overcome by liberal treatment.

So far, the treatment of unfruitful trees may be said to be confined to those only recently planted. When trees of more mature years are barren, then more cautious treatment must be resorted to. For example, nothing is more common than for pear or plum trees, of large size, when trained against the wall to be entirely fruitless. To take up such trees and replant them would not generally be the right thing to do, because being of mature growth, the check of complete removal might be too great. In such cases the best thing is to commence at the extreme point of the roots, and to lift them, according to the size of the tree, to within two, four, or six feet of the main stem, and then to relay the roots near to the surface of the ground; or, in case of wall trees, half the roots may be taken up one season, following them to the very base of the stem, and the remaining portion, if necessary the following season. Such treatment, cautiously carried out, will generally restore the balance of force, and with it fruitfulness will ensue. Now come we to the ordinary trees,—such as are prepared by root pruning before they are sent out from the nursery, and may be said to be reduced to a moderate and healthy state of growth. These, sometimes, if transferred to a rich soil, may start after a time into an over-luxuriant habit. In such a case it is customary to check them by root-pruning, simply by digging around one side of the tree this year, and cutting off some of the stronger and more perpendicular roots, and treating the other portion in the same manner the following year. Early autumn, while there is yet some heat in the ground, is the best time for root-pruning, as the warmth enables the wounds to heal quickly, and also to throw out fresh feeders so as to become re-established before the active growth of spring commences. Trees thus managed, with bi-annual attention to root-pruning, may be easily kept in a constantly fruitful state, and for small gardens nothing looks so neat as a bush or pyramidal tree so managed.—*R., in English Garden.*

A CHAPTER ON PRUNING.

The general principles governing the operations of pruning are not applicable to all trees. What would be the correct method to reduce the superabundant growth in one of our specimens would probably ruin the form of another. Varieties of fruits have their peculiar idiosyncracies of growth, which must receive at our hands due reflection and study. A few minutes may destroy what years cannot reproduce, hence the necessity of timely forethought. The theory of wood-growth is in itself a delightful study, and not the dry, learned disquisition that some would have us believe. In a certain sense, every man who makes a business of growing trees should study the so-called scientific aspect of his profession as carefully as the modern agriculturist would inquire into the details of the physical life of his animals; so that in any contingency the owner may be enabled to apply the proper remedies and in a proper manner, whenever the necessities of the case require his skill. When pruning is a perfect system, the outline of the tree is carefully studied, and every branch, yes every bud, is manipulated with a perfect knowledge of the important part that each is expected to perform in the future. There is not sufficient stress laid upon this essential feature by our gardeners when giving their experience. The tendency of every tree is to push its topmost buds more rapidly and strongly than those below, hence the necessity of healing back the long shoots of previous years,

when the branches are too few and the head too open. With regard to the formation of a perfect outline, such as a globular head, or conical shape, it is necessary that the position of the terminal bud after pruning should be considered.

Such trees as grow rigidly upright may be induced to spread by always cutting to an outside bud, while those, on the contrary, that invariably straggle about or droop should be cut to an inside bud. We are frequently deceived in the younger years of the tree in regard to distances between the main limbs, forgetting that in time the annual growth causes them to enlarge and soon to become crowded. A limb removed when small causes little inconvenience to the general health of the tree, but if cut off when large the vital forces are undeniably injured. The body of the tree does not grow lengthwise, but latitudinally; bearing this fact in view, it becomes a comparatively easy task to decide how high the main body shall reach, as well as to decide where the principal branches shall emanate from. Wood growth is at the extremities of the shoots, and upon the outer surface, and when once formed is immovable so far as enlargement is concerned. A fact not sufficiently borne in mind is that pruning induces strong growth, but if persisted in for a series of years, enfeebles the tree. It is well known that hedge plants when cut to the ground will send up unusually strong canes, and this feature has been taken advantage of by some of our nurserymen to form straight, strong stems to their trees. The young seedlings are planted in rows, and the succeeding spring are cut to the ground, when they will make a stem devoid of blemish. The idea that some entertain in regard to pruning over-luxuriant trees to induce fruitfulness is erroneous. Curtailing the roots will answer, but so long as the roots remain undisturbed and healthy, the branches will grow strongly, and cutting them off merely induces a stronger growth, for a few years at least,

The old theory of pruning evergreens was very crude, to say the least of it. Practice has fully demonstrated that they may be pruned as thoroughly and as devoid of any set rule as the deciduous class of trees. They possess the same adventitious buds (dormant and unseen) as the latter, and these will push and form branches when the shoots are cut off. Time was when it was deemed the height of ignorance to cut off the leading shoot of any species of pine, while the modern pruner pays not the least attention to this portion of his subject. Pruning evergreens, by the way, is even more beneficial than pruning the deciduous class of trees, and yet it has not been much practiced. On the principle that pruning induces growth, the shears, if applied annually to such specimens will cause an additional number of young shoots to start, and thus form a denser mass of foliage. The outline of the specimen is also improved, and will retain its form in after years. Dissatisfaction has been expressed with the modern system of pruning evergreens, on account of the excessive primness or formality of their appearance. True, when young, they bear a resemblance to the old Dutch topiary-work, but as time advances, and the shears are withheld, the advantage of early and frequent pruning imparts a marked character to the specimens obtainable in no other way. These remarks are applicable to our flowering shrubs as well. As generally seen these are entirely neglected, and yet after a few years' annual pruning into shape become perfect models in outline and density, so that when covered with bloom, which they will be in an increased ratio, the improvement is really wonderful. I have only to add, by way of suggestion, never cut off a twig unless there is a good reason for it, and let it be in accord with some definite purpose.

JOSIAH HOOPES.

PRUNING GRAPES.

It would seem that sufficient has been written on this subject, but from the many inquiries I receive, and badly managed vineyards, and the great importance I place on proper pruning, I think still more may profitably be said. It is a very easy matter to keep a vine in proper shape if taken at time of planting; but not so with an old vine that has been allowed to fruit out at the extreme end every year as it is its nature to do, and has no new wood within ten or fifteen feet of the root. I have a vineyard of five hundred vines, planted ten years ago on sandy soil, some of it so poor it would not produce a fair crop of white beans; but have had a good crop of grapes every year since old enough to bear, and of a quality I have never seen excelled. They have been pruned in the following manner: First year after planting, wood all cut back to two or three buds in the fall; the following spring only two or three of these were allowed to grow, according to strength of vine; the next spring I cut these back to two or three feet from the ground. The next or third year, allowed two or three canes to grow from near the ground, and rubbed off all others as soon as they started out. In the fall cut off the old wood (or that produced the year before), and headed back the new canes to five or six feet. At this age the vine is old enough to produce a full crop, and from three to five canes may be allowed to grow each year, always encouraging their growth from near the ground, and each year pruning off in the fall or winter the wood that is two years old and has borne fruit that year. My vines that are ten years old have not more than from one to two feet of old wood on. I am fully convinced that this so-called renewal system is the best to get grapes of extra quality, and to have them ripen early and evenly, I would advise bringing old vines back to this system, although it may occasion the loss of one or two crops; the quality will richly repay the loss. Some that thought this system of pruning not practicable years ago now wish instruction how to get their vines in shape to produce grapes of good quality.

Kalamazoo, Feb. 6th.

J. N. STEARNS.

EFFECTS OF PRUNING.

The branch of an apple tree is cut off, and soon numerous shoots are thrown off from the end, replacing the single branch removed by several, the number being regulated by the number of normal or adventitious buds which are forced into growth. In the same, but in a more marked manner, on account of the moisture in the earth and other circumstances, the cutting of the root of the apple tree causes new fibers to be developed throughout the whole periphery of the cut, and the one root removed may be replaced by fifty fibers or fibrils, starting from the line of severance.

We observe that when a hedge plant is judiciously pruned, the number of small branches and branchlets are immensely increased, as are also the proportion between the leaf and the stem. The pruning of fruit trees forces the multiplication of shoots and leaves, and the pruned plant, more compact in form, presents a more symmetrical, and more abundantly leaved plant than the unpruned, and presents a larger area of leaf growth within a given space. In orcharding, as by analogy, so we know by practice, that the pruning of large roots is followed by the sending out of numerous smaller ones. We know that

the nurseryman increases the fibers on his trees by frequent transplantings or root prunings. Indeed, it cannot be questioned that among fruit and ornamental trees, root pruning causes an increase of fiber, and this is equivalent to saying that within a given area, the pruned tree obtains possession of a larger amount of the fertile elements of the soil.

Among herbaceous plants, analogy would seem to indicate the same law. The pinching of plants, in order to thicken their manner of growth, is an ordinary practice. Through the means of pruning, a straggling, few-limbed plant, may be made bushy and compact. The gardener pinches the ends of his melon or squash vines, as by so doing he increases the number of lateral branches which produce fruit. Under certain circumstances, the farmer treads or crushes down or mows his grain-field, in order to thicken and strengthen the growth. Thus London: "It [rolling] is likewise found beneficial to the young crops in the early spring, in various instances." And Thier recommends cutting the tops of the plants, or turning sheep on the cornfields in April, where the soil is very fertile, and the wheat plants, which before appeared to be few and far between, suddenly shoot into vigorous vegetation.

We do not so often think that the pruning of the roots of these plants, also, may increase the fibrils in the area adjacent to the cutting, and produce for the plant a greater command over the resources of a given plot of soil. In examining the roots of the corn plant, I have found instances of the branching of the roots in the presence of obstruction. The root of the wheat plant has primary, secondary, and later systems of roots, and divides when brought against an obstruction, in the same manner as would the root of a tree.

Root-pruning is employed to increase the fruitfulness of trees. The dahlia in the garden, an herbaceous plant, is made to produce more abundant bloom, by the trimming of its roots.

E. L. STURTEVANT.

PROTECTION.

EVERGREEN BOUGHS FOR PROTECTION.

In the case of the strawberry-bed there are reasons against an unctuous winter mulch from the barnyard, since the manure may convey weed and grass seed; nor, indeed, does the strawberry like any such heavy, close blanketing as shall be impervious to free admission of air. The plants of this crop want breathing space even in winter, else they would not have been provided with leaves that outlast the coldest weather. Loose-lying pine needles, or forest leaves or clean straw make the best protection; and manure is best applied in shape of some concentrated fertilizer mixed with fine mould early in the spring. What we have said about the strawberry suggests the further remark that winter protection for all plants and shrubs that carry their leaves throughout the year, is best given by a covering that affords free access of air.

The English ivy, the rhododendrons, or a half-hardy evergreen of the coniferous tribe, are more safely guarded by a protection that affords filtration to

the wind, than by one absolutely close. The ivy is not unfrequently smothered by the compact straw-matting which is put to its shelter with a damaging excess of care. The wattled branches of fir or pine make safer protection, and a very easy and good shelter for rhododendrons is made by simply thrusting into the earth around them and among them, well-developed branches of cedar or of firs. The same device is capital for the protection of newly planted evergreens, which, by reason of their recent transfer and strange situation, may not be able to cope with the storms of the first winter. A tender vine, too, upon a north wall,—whether the vine be deciduous or evergreen,—will profit greatly by such shelter as we suggest. So will the beds of sage, or thyme, which used always to have place in every farmer's garden.

Below the latitude of 38°, or thereabouts it is quite possible to protect the lettuce plants of the hardier kinds in this way, if good exposure be chosen, and proper attention be paid to the efficiency of the shelter. An out-lying trench of celery may often be kept in best possible condition up to January by a well-arranged shelter of leaves and pine boughs. A farmer's cellar, which may be subjected to frostiness in extreme weather, may be safely protected by pinning down two or three close layers of pine or hemlock branches upon the exposed sides. This, too, has a far neater appearance than banks of strawy manure, and is far less likely to be disturbed by investigating poultry.

Of course, what we say about this use of evergreen boughs will not greatly advantage those who have no such wood growth at command. But the cedar and pine and hemlock, have a pretty general establishment over the northeastern and middle States, and the uses suggested may stimulate still further the disposition on the prairies of the west, for belt-planting of evergreens. In both ways they are admirable warmth-keepers. Nature gives a long "shag" to the coat of the polar bear. We do not make so much account as we might of the vegetable "shag" of the evergreens, whether in belts or in boughs.—*N. Y. Tribune*.

THE COLD WAVE OF THE WINTER OF 1874-5 AND ITS LESSONS.

The wholesale destruction of fruit trees and the mutilation of grape vines during the winter of 1874-5, are less of a mystery than the extreme and prolonged cold weather that was the main cause of these disasters. The overbearing of fruit trees, in 1874, with the drought of autumn, had an effect to weaken them and make them more susceptible to extremes of temperature; but the main cause of this arboreal mortality, so far as the States of Wisconsin and Michigan and the northern parts of Illinois, Ohio and Indiana are concerned, was the extreme cold. Usually, steamboats, except when ice-bound in port, pass during winter from Grand Haven to Milwaukee, and seldom or never meet with any obstruction outside of their harbors: but during the period mentioned, no open sea was known throughout the whole width of the lakes, and the supposition is that, for the first time in the history of its navigation, Lake Michigan was entirely frozen over after Feb. 9, 1875.

It had been claimed before, that the surface of the lake, except along its shore, never got below 40° above zero, and to the existence of this open sea to the west of the eastern shore, we have ever considered ourselves indebted for this so-called "Peach Belt," extending north and south inclusively, from Grand

Traverse on the north to St. Joseph on the south, and inland from two to ten or more miles, according to the topography of the country, a distance of nearly 200 miles north and south. But in the spring of 1875 commenced the funerals and cremation of most of the peach and a great share of all other fruit trees through the whole extent of this "Peach Belt," except upon the most elevated locations. We had been taught in our schoolboy days, that as we go up, the air becomes colder; so much so, that on the highest mountains—even under the equator—there were perpetual ice and snow, and aeronauts tell us of the extreme cold of the upper regions, all of which we have no right to doubt.

But experience, that grand and truthful old school-master, tells us that if we would avoid the killing frosts of spring and autumn, and the blighting effects of mid-winter, we must plant our tender fruits on the elevations and shun the valleys. Hence arose the expression of a writer on this subject, "get up high with your plants if you would avoid killing frosts, but if you get too high you and your plants will freeze to death together."

Much has been said in favor of trees, arboreal belts and forests as protections to animals and plants, against cold, especially in breaking the force of winds, which always and everywhere disperse and carry away from the place where generated a portion of the heat produced by all animals. Now, these ideas about hights producing or reaching cold, and at the same time lesser hights being a protection against the effects of cold, are not, by any means, whims or irreconcilable one with the other. They are both true, however inconsistent they may at first sight appear. In the case of protection to plants, it is not really altitude that effects any good; for most surely its effect is injurious in a degree in proportion to its height; but the favorable effect is produced simply by the contiguous lower grounds that allow the air as it cools and (consequently becomes heavier and sinks to the ground) to drain off and give place to the warmer air above it. But this is not all. It is generally known that these killing frosts of late spring and early fall occur only on still, cloudless nights; that winds, even "gentle zephyrs" and thin, transparent clouds operate to prevent them, the first by mixing the cold with the warmer air, and the last by preventing the rapid escape upward of the heat from the earth, and still further by creating a current downward of the cool air of the hillside, and upward of the air heated in the valley during sunshine.

The fact is familiar to farmers that their corn is often frost-bitten in the valleys, while it escapes on higher grounds, but the fact that the same thing was possible in mid-winter, even so far as to destroy whole plantations of peach trees on level or slightly hollow aspects, was left to be demonstrated most fully on this celebrated "Peach Belt" during the period mentioned. In the whole length of this belt we heard of no peach trees of choice varieties that survived this cold wave, except upon these high and airy aspects, where the air had free circulation. Other fruit trees suffered less proportionately in the order here mentioned: pears, cherries, plums, and apples, in each of which some varieties escaped in ordinary exposures, but a much larger proportion stood the winter on the elevations mentioned. These facts have here given rise to the expression, "atmospheric drainage," and the lessons taught us by these disasters are: first, in planting fruit trees to take this matter into serious consideration in the selection of aspects, and second, to select for our orchards such varieties as have escaped serious injury during the period mentioned, or, as some have expressed it, to "plant only ironclads."

I have noticed that many are under a mistake about the effect of winds upon

the thermometer. All animals are constantly, during life, generating heat, which ordinarily is passing off into the surrounding air. Winds dissipate this heat, which causes a cooling sensation to the animal. The thermometer, not generating heat like the animal, the effect of winds upon it depends entirely upon whether they bring warmer or cooler air than that which is normal to the locality. Trees in winter evidently generate heat, but in an infinitely less degree in proportion to their bulk than warm-blooded animals. Still large tracts of forests have the effect of modifying the rigors of winter to a great degree, and the fact that in small openings in a new, densely-timbered country, peaches and other tender fruits are a success until the country is more generally cleared up, and then fail entirely, has led many to believe in belts of trees as a protection against frost; a very natural conclusion, but one that does not stand the test of experience, except where they form a canopy and prevent the nocturnal escape of heat. Cases are not wanting, on this lake shore, to illustrate the position I have taken; one, which came under my personal notice, I will relate.

A nice warm basin of some two acres near the summit of the bluff that lines the eastern shore of Lake Michigan, and but a few rods from the lake on its west side, and from Lake Muskegon on its north, well protected on all sides with hills and a dense growth of small timber, was put out to peach trees. Well, they did not wait the cold winter, they were all dead before it, while each tree put out near the water, and perhaps five feet above it, and at least 45 feet (judging by the eye) below the valley above mentioned, lived and bore peaches till the hard winter above referred to. In the latter case there was abundant "atmospheric drainage," in the other there was none.

I am aware that abrupt elevation, like trees, fences, and buildings, have an effect to elevate the temperature for a short distance in every direction, especially on the sunny side, and grapes will sometimes ripen in such places that will not ripen a few feet further off, and I now look out upon the only vine I have, unaffected in the winter mentioned (except where artificially protected). It stands on the northeast side of my two-story house, trained eight feet high, and is fourteen feet from the building. Of thirty standard pears, some four years planted, only three escaped that winter, two by being nearly covered in a snow-drift, and one by standing a few feet to the south, but not in the shade, of a thirty-foot oak.

The conclusions I have arrived at from a special attention to the subject for many years, are that forests moderate materially the winter climate in their midst and vicinity, to an extent corresponding with their area: that all trees and other obstructions to the wind prevent, in a measure, the escape of the natural heat from animals, and protect in a measure all plants and fruits from mechanical injury; that solitary trees and belts have a climatic effect for only a few feet, and that, so far as they obstruct the free circulation of air, they favor frost, that special bane of all tender fruits; but at the same time they often have the effect of preventing the blowing off of snow, which is a great protection to fruit trees, shrubs, and vines. C. W. Garfield, Secretary of the State Pomological Society, says in an essay on the apple orchard, "High ground has great advantages, because experience has taught that atmospheric drainage is an important matter as well as drainage of the lands. Timber belts planted on the side of the cold winds, are a protection when they are not too thick so as to keep the air from moving, in which case danger may be apprehended from late frosts in the spring." He then speaks of the advantage of a snow covering.

Muskegon, Michigan.

S. B. PECK.

DOES PROTECTION PROTECT?

All my gardening life have I been a skeptic on the bad effects of a low temperature when unaccompanied with wind. My diary never notes the one without the other. Several years since, when the mercury fell to 14° below zero, and the air was perfectly still, the peach buds were apparently uninjured; but another season not nearly so cold, yet exceedingly windy, the buds were unmistakably killed. This theory has been fully demonstrated the past spring in many instances, but in one particular case was it very convincing. A long bed was devoted to strawberries, and this was skirted in the back by a fine hemlock hedge. At one end of each is a building, so situated that the high northwest winds during winter were prevented from striking either for two-thirds their length, but the main portion being fully exposed, indicated, when spring opened, the exact line of the division between the protected and unprotected sections of both bed and hedge. In the first of these the strawberry plants were so badly injured as to produce little or no fruit, and the hedge was so badly cut up as to need replacing. In the protected portion my strawberries were as fine as any I have ever grown, and the hedge is a model of beauty.

Along the north side of my dwelling I have a bed of rhododendrons: at the western end where the wind sweeps around the corner, the plants were all more or less damaged, but at the other end of the bed they were uninjured. These high driving winds, causing excessive evaporation, injure the vitality of vegetation during the season of partial rest, for vegetation is never entirely dormant. Strong cold winds during a drouth in winter are invariably destructive to all manner of plants not iron-clad, and moisture will go far toward remedying the evil. With all our boasted knowledge about plant-life and the influence exerted upon it by the weather, we are frequently puzzled to ascertain the cause of many a mishap to our choice trees and plants. Acclimation is a delusion and a snare, as many of our cultivators have no doubt learned to their sorrow, time and time again. As a partial remedy I want to impress upon the minds of my countrymen that protection by means of screens and groups of evergreen trees is the best investment made by any one living in the country; at least such has been my experience and observation.

JOSIAH HOOPES.

TRANSPLANTING.

PLANTING YOUNG TREES.

Planting trees of an early age is productive of early and prolonged fruitfulness. We often see fine specimens of fruit growing on trees yet in the nursery row. Peach trees older than one year are worthless. Young trees in the hands of a skillful grower can be made to assume almost any shape, which cannot be said of those of an advanced age. Young trees can be made to branch so low that neither grass nor weeds will grow under them on account of the shade, and I am not sure but this would be a good method with some species. The prolific peach trees in Daniel E. Rogers' orchards rest their branches on the ground when loaded with fruit, yet his might have been trained much lower. However, for general culture a medium height is most desirable.—*Rural Home*.

PLANTING YOUNG GRAPE VINES.

There are two errors which it is well for novices in planting grape vines to avoid. One is, the supposition that a grape vine will grow anywhere, and that it is only necessary to stick it in the ground, leave it without further attention to the fostering care of Nature, and calmly await fruit in due season. The other error is, in supposing the planting and growing of a grape vine to be a great mystery, involving extraordinary preparation of the soil, and a wonderful degree of care afterward, attainable only by the most skillful. The truth, as in most cases, will be found between the extremes. The wants of a grape vine are not many; and the amount of care and skill required to grow it successfully, is not great. As a rule, it is better not to plant young grape vines in the immediate vicinity of large, old established vines, for the ground is sure to be preoccupied by the roots of the older vines, and the soil comparatively exhausted by the elements specially necessary for the growth of the younger plant. The worst place for a young vine is the position where an older vine has died out; and young plants in such situations generally fail, for the obvious reason that, in addition to the exhaustion of the soil, the influences that destroyed the older vine will operate even more strongly against the younger and weaker one. I would never plant a young vine to replace an old one in the same place, without digging out the old soil and replacing it with fresh and lively earth in which grape vines had not been grown. A place where the soil is full of the roots of growing trees or shrubs is not a good one for the planting of young vines, though the stronger growing kinds sometimes succeed pretty well after they are fairly established, and hold their own with other surrounding plants and trees. The best soil for grape growing I have found to be a sound gravelly clay loam, sufficiently fertile to bring a good corn crop; and sufficiently rolling to prevent water from ever standing upon it. In planting, it is well always to make the holes pretty large, and have the young plants standing in a vessel of water, so that the roots are wet when put in the ground. The earth will at once adhere more closely to the roots, and the growth be more prompt and certain than if they were planted dry. The roots should be spread out to their full length, the points inclining a little downward; put in fine earth from the surface next the roots, and then fill up the holes, pressing the ground moderately around the plant, and nothing more is necessary except to keep the surface mellow and free from weeds, to insure a good growth. Except in case of extraordinary drouth, no after watering is necessary; but should this be needful, it is better to remove a little of the soil around the plant, and after watering, hoe it back again, leaving the ground bare.

GEO. W. CAMPBELL.

Delaware, Ohio.

FALL OR SPRING FOR TRANSPLANTING?

We have never discovered any reason why a plant, let it be an herbaceous plant, a shrub, vine, or tree, should be transplanted in the fall rather than in the spring for the climate of New York and north of it. When removed from one place to another in the same grounds and care is observed to preserve a ball of earth, or without the ball of earth, all the roots and fibers intact, it

does not matter whether fall or spring be chosen. It is a question merely of convenience. But when they are removed from nursery grounds and subjected to the delays and exposures inseparable from systematic business routine; when the roots are shortened and crowded together in packages made as small as possible so as to avoid unnecessary expense in their transit,—then we have to determine whether plants so circumstanced stand a better chance of life than those transplanted in the spring.

One of the chief reasons assigned as to why fall planting is preferable to spring planting is, that in the fall, the soil being warm and the roots having an opportunity to grow, they become in a degree established and to that extent prepared to hold their own against the possible or probable droughts of the succeeding spring or summer; whereas in spring transplanting, they are plunged into a cold water-soaked soil; the leaves are precipitated before root growth commences by the air being warmer than the soil and so the plants suffer from the fact that the roots cannot supply the demands of the leaves.

Why not transplant evergreens in the fall? Is not the soil as warm for them as for deciduous trees? Is not the ground as cold for them in the spring? Because, it is answered, evergreens are never at rest. Their leaves are always at work and so consequently are their roots. But this would seem a very good reason, agreeably with the above theory, why they should be transplanted in the fall since as they are never at rest, they would the sooner form new roots in the warm soil of fall than in the cold soil of spring. The reverse is known to be the fact.

It is recommended not to transplant in the fall until the leaf has fallen, or is ready to fall, and the plant has prepared itself for its winter's rest. Do the roots of trees, etc., continue to grow after this period? Is the root active after the top ceases action? Up to the time that the ground becomes hard frozen, yes; afterward, no; unless the roots descend to a depth beneath the action of frost. But the roots of nursery trees prepared for shipment never do, and the check which the tree undergoes from the time of being dug up in the nursery to the time it is reset in its final quarters, is sufficient to arrest all root action for the rest of the fall or at least until freezing weather would, in any event, prevent further development.

Suppose we make a cutting of any hardy plant,—strike it in late September, plant it out in late October. Without protection, as a rule, this plant will be found dead in the spring. The roots are too tender to endure the rigors of winter. It is so with transplanted trees. The fibrous root-growth which may be induced by the warmth of late fall or by mild periods during midwinter, being near the surface, cannot stand a zero temperature that may immediately follow—and the result is that the tree is weakened by just the amount of nourishment required to produce those fibrous roots.

In the question as to whether it is better to transplant in fall there is but one thing to be considered. Will the transplanted tree be injured by the probable severity of the ensuing winter? If they are trees that are never injured by twenty or thirty degrees below zero—never injured by freezing to-day and thawing to-morrow, plant in the fall. That a tree with its roots cut back as they are for shipment, is as well able to endure the effects of severe winters as one that has its roots entire, is an absurd supposition. But the spring-transplanted tree has its roots shortened the same? True, but the winter is passed and spring-time, its natural growing season, is at hand. It is essential, certainly, that trees and shrubs should be removed in early spring before a bud has swollen.

If otherwise: if the plant is half-leaved out when received from the nursery, be sure it is greatly weakened and that, in case of drought, it will be the first to perish. Without a drought this plant will scarcely more than sustain itself—and another year at least will be required to restore its vigor. Cutting back in such cases can do no good. Its strength is spent. Last year's labors have been chiefly thrown away. The leaves are ready for work—the roots are not.

In the fall of '74, we transplanted about 100 trees and shrubs of various kinds received from nurseries. All know of the exceptionally severe winter following. A majority of them—let us say sixty per cent—were found to be dead in the spring, or so badly injured that they died afterwards. This spring we received and planted as many more. The drought has been as exceptionally severe as was the winter of '74 and '75. Yet our losses have been less than twenty-five per cent. This is not offered the reader as positive proof in favor of spring transplanting, since the varieties and species of the two sets are not given him for comparison. But to us who know of all modifying circumstances, it is convincing that where plants have to be purchased of nurseries at such a distance as to necessitate packing and shipment, the spring is greatly to be preferred for the climate of New York and north of it.—*Rural New Yorker*.

TRANSPLANTING EVERGREENS.

I am aware that the general opinion and advice are that the time to transplant evergreens, whether tree, shrub, or vine, is in the spring. I fell in at one time with this idea, and stated that in spring, just as the new growth was forming—just as soon as the buds began to swell—was the time to make a sure thing in the transplanting of an evergreen, no matter what the variety. In a long life of practice in the laying out of gentlemen's places, public grounds, etc., in my way as a landscape gardener, it has come to me that error existed in the aforesaid advice to plant only in spring. I reason in this way: *First*, It is not possible for a large number of those who plant evergreens to have them in spring just when they should. *Second*, There is always more hurry of work in spring than in autumn, and consequently the work of planting is not as thoroughly done as it should be. *Third*, In the month of September and early October the nurserymen are comparatively at leisure and can give more and better attention to the digging and shielding the roots from the sun or cold drying winds, before they pack. *Fourth*, In the autumn, say from the first of September for three months, the evergreen is as near in its dormant state as ever: the ground is warm, and from fall rains is usually moist, without being really wet, as in spring, and being warmer than the atmosphere, nature does, what our best gardeners do when they propagate by bottom heat—she furnishes a bottom heat and moisture in sufficiency to cause new roots or rootlets (fibres if you will) to grow from the wounds made in the work of digging, by which many of the supports of life, to the tree, or plant, are lost. This renewal of new roots, made in autumn, not only aids the tree or plant to support itself during winter, but it goes to work, in spring, and supplies food for growth; when the roots of trees planted in spring are struggling to make new fibres in a cold soil with the atmosphere twenty degrees above, and calling through the leaves for food.

I write this not from theory, but based on practical theoretical knowledge, and from practice in removal of thousands of evergreen trees and shrubs in the autumn months. Here let me say, that I prefer from the 10th of September to the 20th of October to do the work: but with due care never to leave the roots half an hour exposed to the sun or dry cold winds. There is no fear of want of success—provided the planter has the ground prepared for planting as it should be, and at the same time knows how to do the work.

HOW TO DIG AND PLANT.

The digging of evergreens is one of the mechanical arts of horticulture. A common hand, knowing nothing of roots, will go to work with his spade, and putting it broadside toward the tree, within four inches of its main roots, will then bend back the top, held in his left hand, so that when he puts his foot upon the spade to press it into the ground, it will enter the earth at angle of forty-five degrees, and about four inches in depth, cutting off all the side roots and mutilating the tap roots at about five inches depth from the surface; then he catches hold of the tree by the top shoot, the growth of the past season, and twists and turns it until there is not a root left free of cracks. The tree comes out entirely free of earth, and is thrown back, to lie in the sun or wind, until the whole row or lot ordered is dug. Now he who knows how to dig a tree, will set his spade in edgewise towards the tree, knowing that its roots ramify and extend more towards the open ground than in the row. He loosens gently the ground by placing the spade or digging fork (the latter is best) so that it will enter on a straight line twelve inches into the ground; then he lifts gently, throwing the earth away from the tree or plant. Next he takes hold of the plant or tree close down to the earth, and pulls straight upward, bringing it to the surface with a mass of earth around the crown, and each root with only its small fibres broken. The plants are (or should be), as fast as raised, gathered and wrapped in a mat, or be put into some barrow with a cover, to protect them from the wind or sun.

This answers for small trees or plants, or trees of two or three feet high. Large trees of fifteen to thirty feet high, and with the lower branches spreading six to eight feet, should first have the lower branches bent upward and secured by a soft belt to keep them from injury by the diggers. In the digging of these the spade should be set in eighteen inches to three feet from the body of the tree, according to its size, with its edge to the stem or center of the tree and a trench be dug eighteen inches deep and wide; then a spading fork should be inserted underneath the outer roots, the earth removed again and again, until the tree stands mainly upon a ball of earth four to six inches in depth, and on its tap root. Now dig away one side until the spade or knife can be used to cut the tap root or lateral sub-roots, smoothly. Next place some hay, or straw, or clothes under one side beneath the roots, bend the tree over upon it, and draw a mat from the opposite side under the tap roots, etc., so folded that when the tree is canted back the roots may be gathered in the mat; tie this mat to the stem, lift and place the tree upon a sled or low-wheeled wagon, then moisten the mat and transfer to the place for replanting.

The whole art of planting is to have the hole or trench dug so deep that the tap root will stand on a conical mound in the center, and have the tier of upper roots four inches below the surface. Then lay down the lower tier of roots so that they lie level upon the ground beneath; cast fine earth over and among them, pressing it firmly among the roots with outspread fingers; do the same way with every tier of roots to the surface, being careful all the time that the

main or tap root is bedded firmly. Do not tread upon the earth with your feet, or beat upon it with the spade or pounder. Any and all of this work causes the roots to become bent, and injures their healthy action.

F. R. ELLIOTT.

FALL SETTING OF RASPBERRIES AND BLACKBERRIES.

Last year we urged upon our readers the importance of setting these in the fall. Another year's trial has the more fully convinced us of its importance. Last fall we set out about two acres, billing up the plants well when set, and the past spring we set as many more. To-day those set in the fall are fully double the size of those set in the spring, while the failures to grow will number four times as many in the spring planting as in those set in the fall, and besides, there is so much more time in the fall to do work than in the spring.

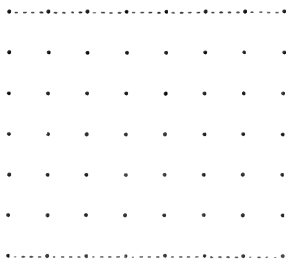
By setting in the fall, and a small quantity of manure thrown over each hill, the soakings from this going to the roots of the plants, gives them double the start the next spring.

One important point in growing small fruits, for either family use or market, is to get as large growth as possible on the plant or vine the first year, for in proportion to their growth, so will they yield.—*Fruit Recorder*.

STRAIGHT ROWS.

The following instruction about planting straight rows needs to be often repeated. It is from the pen of J. J. Thomas:

The first thing is to lay out the ground by inserting a stake or peg wherever a tree is to stand. If the orchard is to be square or oblong, and of moderate size, this work is quite simple; if irregular or large, it must be divided into sections, so as to take the parts separately. First, you want a long garden line or strong cord. If the ground is uneven, twenty rods will do; if nearly level, it may be forty rods long, with strong pulling at each end. Then measure off the spaces (say 33 feet) on this cord with a rod-pole, and sew through and tie on a piece of red yarn at each division or place for a tree. The red yarn will be readily seen when staking out. Or, you may pass the cord lengthwise around a board eight and a quarter feet long, and insert the yarn at every alter-



nate coil. Stretch this line along one side of the field, and insert a wooden peg at every mark. Then stretch it along the opposite side and insert pegs, having previously measured off the right distance between them with a line. Then begin at one side and peg the whole field, as shown in the figure. The cord will stretch some, having some elasticity; but if you bring it exactly out to the line of pegs at the end, *all* the pegs will be in perfectly straight rows.

NOTES FROM THE ORCHARD COMMITTEE.

At the risk of duplicating an occasional fact that may be given elsewhere, we take from the MICHIGAN FARMER the following letters, written by Prof. Beal, while on his trip among Michigan orchards:

ACRES IN FRUIT AT TRAVERSE—PIONEERS—SUMMER RESORT—INDIANS.

Near Traverse City, on the farm of Judge Ramsdell, are thirty acres planted to fruit, including 700 plum trees, 300 peach trees, large quantities of grapes, some apples, cherries and small fruits. His plums are a sight to behold. The trees are healthy, with glossy, bright green leaves and plenty of fruit. Of grapes he prefers the Iona, all of which he makes into wine.

At Old Mission, Mrs. A. H. Tracy shows a fine residence, with greenhouse and ornamental grounds.

Reynolds & Tracy have 65 acres planted to fruit, including one of the finest plats of Philadelphia raspberries ever seen, and large quantities of pear and apple trees generally in thriving condition.

Mr. George Parmelee enters for premium an apple orchard, a pear orchard, and a cherry orchard, in all covering 115 acres. They are all very fine, especially the pear trees and cherry trees, which can hardly be excelled for excellence in all respects. The details of kinds, yield, profit, etc., must be delayed for the final report, but they show that the country is really extra for plums, winter apples, pears and cherries.

Besides these orchards there are others about Traverse City; probably in all amounting to 500 or more. All honor is due to these pioneers who are trying all kinds of fruit in this new country. They deserve more credit than those who destroy timber in a wasteful and slovenly manner. These men are at much risk and expense testing the capacity of the country for fruit. This will prove the best advertisement to the lands in the surrounding region. For this good work we should make especial mention of George Parmelee, J. G. Ramsdell, Reynolds & Tracy, Montague, Curtis, Strong, Avery, Brinkman, Marshall, and others.

In all places we met people hunting for cool air and fishing-ground, rest, and recreation. For this purpose, many portions of Northern Michigan must always be prominent. As the southern portions become older and better

improved, there will be an increased annual ebb and flow to the woods, the crystal lakes and the cold springs of the north. The Methodists have a summer resort at Petoskey; the Presbyterians and Episcopalians, and perhaps other denominations, are already looking for suitable permanent headquarters for a summer resort in that wild and beautiful country. We have heard of Lake George, Niagara Falls, Saratoga, and the Adirondacks, as summer resorts, but only a few know that we have just as good places of resort in our own State. Here still are fine grounds for fishing and hunting and boating; a delightful climate with no miasma, and there never will be a better time than now to see the primitive forests in all their beauty, wildness, and grandeur. We can but hope that large tracts will in some way be retained in their present attractive condition.

We took a steamboat, "Queen of the Lakes," and went through Elk Lake, Round Lake, and Torch Lake,—a ride of 30 or 40 miles. In some respects it excels a ride up or down Seneca or Cayuga Lakes of New York. The banks are in many places high and clothed with beautiful heavy timber, rising in high terraces back from the lakes. Many other lakes and chains of lakes are supplied with small conveyances, which offer easy passage to a great variety of fine scenery. The visitor cannot help being delighted with the water, which is almost invariably cold and clear. It is not uncommon to see objects 40 to 70 feet, at the bottom of these lakes and bays. Here, at the stations, is a chance to study the "noble red man," loafing about or slowly working for a few hours at some temporary job.

At Elk Rapids one can learn about making pig-iron in all its details. Of almost any one he can learn of the fishing grounds; of the habits of whitefish and trout; of spearing whitefish in 17 feet of water; of the plucky pioneers who have been through and are going through all kinds of hardships. I cannot help mentioning one case,—Daniel Blakely, of Eastport, Antrim county, who went into the woods 13 years ago, fifteen miles from any road. Mr. Blakely had only \$30 in money and no house; he cut his foot while building a shanty, and was laid up six weeks or more. Money and food were gone. His wife was ready for any emergency. My notes run as follows: She cut 14 cords of wood and drew it with steers, for which she received \$28. He got \$45 per month with team in winter; cleared land; gave some farms to boys; keeps tavern, sells no liquor; lots of friends.

At Old Mission we found two graduates of the Agricultural College on large farms. At Little Traverse are two more, and a fifth, who came near graduating, keeping bachelor's hall and clearing up farms.

OCEANA COUNTY—FRUIT AND TREE AGENTS.

At Grand Rapids, S. B. Smith entered for premium an apple orchard which received a diploma five years ago. From here the committee went to Shelby, Oceana county, where they were met by E. J. Shirts, who took them thirty-two miles with his Indian ponies. This country none of us had ever seen before. We went nearly straight to the lake shore, ten miles, and took dinner with Mr. and Mrs. Chubb, and then viewed their orchards and gardens. Here we saw 1,000 peach trees and 1,000 plum trees. We were shown trees some of which

at four years after setting bore plums which brought \$10 a tree. Various kinds of raspberries, strawberries, and blackberries seem to be at home and thrive to an extent surprising to all of us. In Oceana county, other places were visited, among which were those of C. A. Sessions, Wm. Sours, H. E. Russel, Wm. F. Lake, C. W. Jay, J. H. Sammons, and others. Mr. Jay has 2,000 peach trees.

Down on the lake shore, at Little Point Au Sauble, on a hill sixty-five to eighty feet above the water, and sloping to receive the unbroken winds from the west, was a peach orchard of 125 trees which had been set five years. The soil was nothing extra and the trees had not made a large growth. They were remarkably sound, though there had been some killed by the borers. Not a tree was injured by either of our recent severe cold winters, after each of which we were assured by several witnesses that all the trees bore a full crop of nice fruit. Most of the fruit trees in the county are young, but enough has been done to convince the residents that most of our fruits will thrive there and produce large crops. They are setting out large orchards. The favorite peaches are generally Hale's Early, which does not rot as in most other places, and Barnard. Most other standard varieties we saw there, but all of them are rather shy bearers. No one understands the cause of this. We were shown some fruit of the Alexander Peach, which is very handsome and earlier than Hale's.

We saw several Bigarreau cherry trees set nineteen years ago, which were sound and healthy and fruitful. One we measured girted in the smallest place four feet.

In this new country we heard almost a universal wail against tree-agents, who had swindled them outrageously. The safest and best way for them to do is to send one of their own number to some of our best home nurseries to select and purchase their stock. A full report will be made of these orchards at our December meeting in Grand Rapids.

CRANBERRIES—SOILS COLLECTED FROM ORCHARDS—GRAPES FOR THE FAIR—SOUTH HAVEN—ST. JOSEPH—THE YELLOWS—LONG-ARMED GRAPES.

Something new in the line of entries was made this year by Mr. Reed, of Robinson, Ottawa county. This consisted in a small piece of cranberries planted several years ago. Enough has been done to demonstrate success if proper labor is given. There are several acres of marsh of the same quality as that reclaimed. The marsh is drained partially, and covered with muck not over a foot thick. A deep plow will turn up an abundance of sand, which is just the thing for cranberries. The soil now in some places raises good corn, potatoes, timothy, red clover, and many other crops. In other portions of our State, as at Walton, are marshes which are suitable for cultivating cranberries. No one in these times can go on and coin money from cranberries without thorough work and study. We hope to see this subject more thoroughly investigated in our State.

In many portions of our State the fruit-growers are going to send specimens to the coming State Fair. So they talk. We hope to see sharp competition in all fruits. On account of visiting vineyards before grapes are mature, the com-

mittee request the owner of every vineyard entered for competition to send samples to the State Fair, where they may be tested and compared. This should form a very interesting feature of our fair.

We also collected three or four dozen samples of soil from different portions of the State, which we intend to show in jars at the State Fair, and then preserve them in the museum at the Agricultural College. Many of these soils are from orchards and vineyards which have taken or will take premiums. The samples are from the surface, and at different depths, sometimes four feet down in the vicinity of some of the best trees in the orchard.

At South Haven we claimed fifteen entries.

Mr. L. H. Bailey estimates his apples at one-fifth of a crop, and he has as many apples—yes, more apples than we saw anywhere else. He soberly remarked that he had never before lost so much money as he had lately. He had lost \$1,500 within the last three weeks by not having apples enough to fill his orders. Early apples are generally more plenty than fall and winter apples will be. As a rule trees which are bearing full this year bore a light crop last year.

They are going in for more fruit of all kinds about South Haven. They believe in fruit for profit. They estimated that last spring 75,000 peach trees were set in the vicinity of the village. This fruit is seldom raised there without effort. Some of the owners are said to sleep in their orchards. They are in them nearly all the time, giving the best of culture, killing insects, etc. The yellows have troubled peaches for several years, but trees are cut out as soon as discovered. A committee attends to all who are negligent in this respect.

Some of the largest peach trees were seen in the orchard of A. S. Dyckman. One set seventeen years ago was thirty-nine inches round the trunk, spread fifteen feet each way, and would yield fifteen baskets of a peck each. It was an Early Crawford. From this tree by actual count had been thinned at one time 8,000 peaches, and at another 2,000, making 10,000 in all. One man would spend a day thinning four to six trees. He estimates that it will cost this year \$500 to thin his peach crop. Peaches are plenty this year, and he intends to get extra prices for fine large fruit, such as will have little competition. We passed through Benton Harbor and St. Joseph, stopping over night, although no entries were made there. They are giving up peaches on account of the yellows. We were shown by Mr. Whittlesey his long-armed grape vines. Concord vines set in 1860 were on a trellis 50 feet long. By their side, of same age and soil, were vines 8x8 feet which contained less fruit and smaller bunches than were seen on the long arms. He is testing the matter thoroughly. A fuller report will be made in September. Many men had met with severe losses on account of dying peach orchards, which were their main reliance for a living. We are satisfied that mixed fruit raising is the best and safest for many reasons. "Too many eggs in one basket" is a maxim which all wise men will give heed to if they wish to pursue any business with success.

From this place we went up the St. Joe River on a flat bottomed boat to Berrien Springs. This was a novelty for our party, and was enjoyed very much as we viewed the ever shifting scenes of over-hanging trees and vines, of cattle by the shore, of fields, springs, sand bars, snags, turtles, fishes, etc. The trees were not tall, but handsome; the scenery was not grand, but beautiful. Now we see a cluster of silver maples and some buttonwoods and willows, with here and there a hawthorn. Now we see pawpaw bushes, occasionally the Kentucky coffee tree, plenty of basswoods, elms, hackberries, pepperidge, and everywhere

vines of the wild cucumber, grape, and American Ivy or Virginia Creeper. We could imagine that it was a ride up the Mississippi in miniature.

FROM BERRIEN SPRINGS TO KALAMAZOO, PAW PAW, IONIA, MONROE
AND MANCHESTER.

W. H. Miller, at Berrien Springs, exhibited fine young orchards of apples and pears. Were it in our line, we could hardly refrain from speaking of the good farms and new ideas picked up here and there about the State among the thriving farmers we met. But we had our time well occupied in taking notes and observations of the many points in regard to raising fruit.

At Paw Paw, A. Engle enters a bearing peach orchard, and C. Engle a bearing peach orchard and a young peach orchard, a pear orchard, a vineyard and a plum orchard. These are on very high rolling land, and doing well, generally. The peaches ripen earlier than on the lake shore and find an eastern market. No yellows has yet appeared. The young trees lately set far exceed the bearing trees in number.

I give one reason for this movement. Mr. C. Engle's peach orchard for the past eleven years has netted him 2,125 dollars, averaging nearly 200 dollars per acre per year. In this estimate he takes out boxing, commission, expenses, etc. For his labor, use of land, etc., he gets the above amount. Mr. C. Engle is much discouraged with his pears. The main orchard, which took the diploma a few years ago, is now nearly ruined by the blight. He is going to cut it all down. His plum trees look remarkably fine and encouraging. His grapes also promise a fine crop of good fruit.

We learned that in Porter, a neighboring township in sight on high hills, there have been set probably 50,000 peach trees, while on the hills at Paw Paw there are only about 6,000 peach trees.

At Kalamazoo we examined a nursery of L. G. Bragg & Co. At present we will only say that things have much improved there within the last four years. The nursery is in excellent condition, the stock is fine and healthy. I never passed through a nursery of the same extent anywhere which contained less diseased stock than this one. By diseased I mean apple trees which were unsound. I looked sharp, but only saw about half a dozen in 75,000 trees which were old enough to put on to the market.

Three miles from the village of Allegan, we examined the apple orchard of Joseph H. Wetmore. There are some grand farms with deep rich soil on high land. Trees grow well. We saw a yellow Spanish cherry tree set thirty years ago. It girted fifty-three inches, was a pattern of health and had for many years borne large crops of fine fruit. Since 1839 they have always had peaches. From the highest point of his farm we could see twenty-two miles in one direction and not much less in several other directions. Its elevation and good soil give it the capacity to bear sound trees. Here by the road side we saw some second growth sugar-maple trees on which the limbs were blighting somewhat as seen on trees of apple and pear and quince.

At Ionia N. E. Smith enters three vineyards and a peach orchard. Fruit trees and vines thrive here for the same reasons they thrive at Mr. Wetmore's place, the farm is quite high and of excellent quality.

We should call Monroe the Vineyard City had not some one already styled it the Floral City. She must for aught we can see, ever be prominent among the sections of our State for the excellence of her grapes. If a man has a good thing he generally knows it. These Monroe people know the value of their grapes. J. C. Sterling enters a vineyard of three acres, Charles Toll another of four or five acres. Vineyards are also entered by Joseph Sedlaczek, Leonard Reisig, and Joseph Reisig.

Among these vineyards and in others examined, on every variety of grape seen, we found Phylloxera on the roots, and in some cases on the leaves. We do not wish to be too hasty in our notice of this insect, but think that it is doing considerable damage at Monroe. We examined with much interest the entries made by Daniel Ilgenfritz. They consist of a young apple orchard of 1,000 trees set two years, 500 pear trees of same age, 500 quinces. Our final report must be somewhat lengthy in noticing these orchards set by a man who knows how. Here were 1,500 trees all set without a single failure. He does not believe that there is any need of losing trees. His apple trees were not killed accidentally (?) by mice or by rabbits the first winter, because he mounded them up well with soil at the base, and above this conical mound he wound and tied on two thicknesses of paper, the outer one of which was tarred. One tree was left without such protection by accident or design and it was peeled from the roots to the limbs. The mounds of soil and paper wrappings cost about ten dollars.

We spent considerable time in passing over the nursery of I. E. Ilgenfritz. We called twice at the nursery of Reynolds, Lewis & Co., but the proprietors were both absent. We can only say that we found an abundance of good stock, of fruit and ornamental trees and vines. We can only wonder and exclaim why do people go to other States to buy trees which are no better than those near home? The two nurseries we examined, one at Kalamazoo and the other at Monroe have large cellars well drained in which they store in autumn an immense stock of trees and other stock for spring trade. They no longer heel in trees in the old fashioned way over winter. No matter what the winter may be, next spring any man may be sure of getting sound trees at either of these nurseries.

Over the State among the farmers almost everywhere we heard the complaint of tree swindlers,—irresponsible dealers. They are doing a great injury to the people of our State and to the nurseries of our State, and this will continue so long as farmers are willing to be duped and pay their money to any stranger who tells a smooth story. A farmer will often pay three or four times the cost of a Concord grape because a stranger tells some great stories about it and shows a picture which represents some nice fruit. We have no axe to grind in this matter, but only to speak a word which may *first* benefit the purchasers of fruit trees in our State, and *secondly* benefit honest raisers of good stock in our State. If men will be swindled after a good warning, we shall not be to blame. Nine-tenths of these traveling tree agents are dishonest and irresponsible. Buy only of those men you know, or else send directly to a dealer near by who has his reputation to maintain. Granges, farmers' clubs, neighborhoods can club together and send a good man to a nursery and procure good stock at reasonable rates. Do not try to beat down and buy stock whose only recommendation is *size* or *cheapness*. More on this important subject at another time.

S. M. Dorr, near Manchester, called us to see his thrifty apple orchard, which has done so well.

Reading, Hillsdale county, is a rich township from which water starts in several different channels, one way for Lake Michigan, the other for Lake Erie. Here peaches have never been a total failure since the country was settled, though it is not as famous as a peach country as for its excellent crop of corn. Here Charles Caine shows his apple orchard, and Mr. H. B. Chapman his fruit garden.

In Rollin, Lenawee county, Porter Beal has a plum orchard of 260 trees, which have borne for several years. He has demonstrated that care and attention will be rewarded with good returns in raising plums as certainly as in raising almost any farm crop. At least this is true in his neighborhood.

CONTROLLING THE BEARING YEAR OF APPLE TREES.

BIENNIAL-BEARING APPLE TREES.

Man has done very much toward improving upon nature in the production of the various species of fruit. It may be truthfully said that there is not a species of fruit used as food for man but what is much better adapted for the purpose of food than it was when it came from the hand of nature. Perhaps in no species is this improvement more apparent than in the apple. Compare our best apples, our Boughs, Early Harvest, Early Joe, Primate, Porter, Fameuse, Seek-no-further, Spitzenberg, Spy, etc., etc., with the European Crab, if that was the parent of the apple, or even with the ordinary seedling, and you will be convinced that man has produced a very great change in the natural apple.

But with all the changes and improvements made in the apple, there is one desirable attainment that seems to baffle all our efforts, and that is, to make the apple an annual bearer. As a rule, every even year we have a bountiful, sometimes a superabundant crop, but every odd year there is too light a crop to supply the demand. Is there any remedy for this? Is it possible for the apple tree, under any conditions, to produce a good crop of fruit annually?

It is well known by pomologists that apple trees form their fruit-buds in the early part of the growing season on wood of the previous year's growth. As a matter of course, in the bearing season, these fruit-buds must be grown and perfected while the tree is taxed to sustain the growth of a crop of fruit. If this crop of fruit is very large, filling every part of the tree, there is but little chance for the production of fruit-buds for the next season. Sometimes, in the bearing year, there will be a section of the tree from some unknown cause barren, and that section will produce a good crop the next year, while the portion which bore will be barren. We have trees of this character in our orchard. These facts go to prove that the apple tree cannot perfect a large crop of fruit annually. This is a great misfortune. The apple is such a wholesome luxury, such a necessity to good living, that it is very desirable that there should be an abundant supply every year. Is there any means by which so desirable a result can be accomplished?

We know of but one way, and that is such a difficult one that we can hardly

expect it to be employed to any considerable extent. It is to remove the blossoms from a part of the tree on the bearing year, or perhaps it would be less labor to cut or pick off the young fruit as soon as formed. We think this would be pretty certain to induce the growth of fruit-buds for the next year's crop. But will this change be permanent so that the trees thus treated will continue to bear their largest crops in the years of scarcity? We can see but one cause that may prevent it, and that is the following: Every few years occurs a season when, from some cause or other, perhaps a heavy frost while the trees are in bloom, there is a complete failure of the crop. Then all of the trees would form fruit-buds and probably bear a heavy crop the succeeding year. We think this also explains why orchards planted different years, and perhaps beginning to bear in alternate years, after the lapse of a few years are all bearing together.—*Rural Home*.

CHANGING THE BEARING YEAR.

The failure of the apple crop, in some sections, has caused an inquiry to be made as to the possibility of changing the bearing year of the varieties. One writer suggests that removing all the fruit from a portion of the trees one season may remedy the failure. One thing is certain: that a full crop of apples is not ordinarily grown on the same tree for two years in succession. Whether this is caused by a diminution of the reproductive functions of the tree by depletion of its juices, or by natural causes, such as frosts, storms at blooming period, or the condition of the soil, is by no means sure. I am, however, of the opinion that it is caused by a law of Nature, which requires that all used-up tissues be replaced by others before they can be called upon to perform their duties; and, therefore, this season of rest is given to enable the tree to recuperate its vital energies. If this were the fact, however, would it not follow that a crop of apples might be secured by planting trees of different ages? In practice, trees of the same variety bear the same year, not only in the same orchard, but in whole sections of country where soil and climate are alike. Occasional exceptions sometimes occur, an instance of the kind being the Yellow Bellflower, which is this season producing a good crop in one neighbor's orchard, while in another orchard, only a couple of miles away, the same variety is barren. I am inclined to believe that the season has more to do with producing a crop of apples than anything else. Nearly all varieties blossom freely every spring, and, under the most favorable conditions, the blossoms will fertilize; but most favorable conditions seldom exist; hence, the weakened reproductive organs fail to perform their part, and the result is a failure of the crop. A season's rest supplies the tree with a fresh amount of vigor, and even with conditions not the most favorable the blossoms are fertilized.

This is a restatement of the accepted fact that some of our fruit trees long ago adopted the biennial system. But the why of it is not set forth in the conjecture above given. The problem is one of the most interesting in the whole field of pomology, but, although many curious facts have been recorded respecting the "on" and "off" years of apples, etc., no satisfactory reason for the biennial barrenness has yet been presented.—*N. Y. Tribune*.

A FACT REGARDING BEARING.

In my orchard were several large natural fruit trees, and I concluded to graft them to Baldwins. In my neighbor's orchard were two Baldwin trees, one bore a heavy crop one year and the other the next, and he proposed that I cut a part of the grafts from one tree, and part from the other, and graft each tree with the grafts cut from the two trees. I did as he proposed, and the result is that a part of each tree so grafted bears one year a heavy crop of first quality fruit, while the other part is barren. The next year the other part bears. This alternation has been going on about fifteen years without any perceptible alteration. The fruit is nearly as large again as it is on my other trees that give a full crop every other year.

L. WALL.

Webster, N. Y.

APPLE CROPS ALTERNATE YEARS.

A correspondent of the *Agriculturist* gives several examples of the successful fruiting of orchards every year of sorts which usually bear only alternate years. This is done by constant and enriching cultivation. An orchard in Connecticut was visited the barren year, and plenty of apples found. The ground was plowed frequently and manured liberally. Paying crops were as regular as other crops on the farm. The writer grafted a tree with Cogswell Pearmain, in a rich, well cultivated garden, and it bears every year, although this sort is commonly a biennial bearer. Another orchard, with this sort, and Baldwin and Roxbury Russet, manured and cultivated, bears every year. The only difference is between good and extra good crops.

THINNING FRUIT.

The Michigan Farmer, in notes of the Michigan Agricultural College Farm, says:

Here is one useful experiment which exemplifies the effect of the thinning of fruit in summer, to which we have often directed attention. There is no part of the farm that receives less attention than the orchard and its fruit. There is no care given to the trees, and the quality of their fruit. There is no attempt made to thin out the fruit, and to thus grow a higher and better quality of variety. Last year Prof. Beal caused a number of the Northern Spy apple trees to be severely thinned of their profusion of young fruit, with the intention of trying whether the bearing year could not be changed. Every other year a profusion of fruit was gathered, and the off year there was a scarcity. Well, here in the orchard there was a large number of Northern Spy apple trees, several of them had been thinned last year which was a thin bearing year. Every tree that had been thinned of its fruit last year, was bearing a fair average crop of fruit this year, and the trees that had not been thinned, but let alone as is the usual custom of orchardists, were standing next to them without any fruit on them. To Mr. Beal this proved that the bearing year could be changed, or at least sustained that theory as shown by some pomologists: but still it would

not be satisfactorily settled until the trees had had time to show by their future crops that the change had been established. But with such a season as last year, when fruits were so plentiful, and every tree bore with a profuseness that seemed as universal as an epidemic, here were trees that had been checked at an early date by taking off fully one-half of the immature fruits soon after they were formed, and this year their crops of fruit were a fair average.

PRESERVATION OF APPLES.

PRESERVING WINTER APPLES.

Those who grow apples for market and make it an especial branch of business, do not need to be told how to keep them till the proper time for marketing comes; but those who have but a few trees and grow chiefly for their own use, may be benefited by a hint or two.

The gathering should be done by hand, as if shaken from the tree and bruised they soon rot. Even when hand-picked they are often badly used subsequently, and early decay is a consequence. After gathering they should be sorted over, and any that have been injured by grubs or caterpillars taken away. Wherever the cuticle is in any way injured the apple is liable to rot, and such fruit should be kept away from the sound ones. Those which prove entirely whole may be put in clean barrels, headed to keep out mice, and then put in any dry cellar just secure from frost. It is very important to carefully take out the injured ones, as any decay in a lot will often communicate to the whole body. Where but a few are grown a cool cellar, garret or shed, secure from frost, and the fruit laid on the floor or on shelves, is as good as anything. In this case, where there is continual use for household purposes the imperfect fruit can be taken as they appear. This is the general plan; but it is better where time can be spared to sort them over when put in, or soon after, all at once and done with it, than depend on the daily picking out. It is done at once and thus saves time. The women of a household as a rule are much more badly worked than the men, and even a few quarter-hours a day soon runs away with time they can badly spare; besides this, the continual moving about of the sound apples is likely to injure them, and thus the evil from damaged fruit is increased. Moreover, it is by no means unlikely that the seeds of decaying matter may spread to perfectly sound fruit, and thus make them bad also. It will certainly do so in a close barrel, and may do so in more open places.

The success of apple-culture in our State has been very encouraging the past decade. One of our subscribers tells us that he has but one tree in his small lot, and that it is a "red streak," which may, however, mean anything almost; but that from it he has gathered fifteen bushels of apples, which he thinks will keep his family till after New Year's. He says it did not bear so well a few years ago as it has the last six or seven years, but he has been induced to keep a sharper lookout for borers, and he puts on manure occasionally under the tree,

though growing in a sort of waste corner, and the tree now gives him as much satisfaction as any on his lot. Though perhaps half of the fruit is stung by the moth, and thus becomes a little wormy, the balance is good; and by using the injured ones first, he "gets along."

All these things are encouraging. A little more care in looking after the trees, and a little judgment in caring for the fruit raised, would make a half-dozen well-selected trees give fruit enough for some families for a whole season.—*Germanatown Telegraph*.

EXPERIMENT IN KEEPING APPLES.

I finished overhauling my apples with the following result: Bellflowers put up in paper, each one separately; rotten, one peck per barrel; Vandevere Pippin, one-half bushel put in barrels with layer of apples and layer of paper; Orchard Sweets put in sawdust, one peck per bushel. Those in sawdust not shrunk and more as when put up. I put up some on shelves which kept well; poured some on the cellar floor and they kept well. Now, after trying the above plans I think the shelves preferable for the following reasons: First, you can more easily pick out those beginning to rot, and by doing this prevent others from rotting; besides you can open a draught of air into your cellar when it gets warm. I kept the Rambo on my shelves sound to the middle of February. I don't think they could be kept so long in any other way.—*Indiana Farmer*.

AN APPLE CELLAR OR KEEPING ROOM.

Many words and perhaps good ideas are given on the room or house in which to keep fruit beyond its real period of maturity, and yet have it come before the public as good as at its best. There are many kinds of fruits, and also many varieties of each kind; and the outer coverings, or skins as they are commonly called, vary in their quality as preservative of the center. The Nyce fruit-house was a wonder at one time, but when the writer ate pieces of the Baldwin and Rhode Island Greening in May, and knew not what apple they came from, he doubted the value of the fruit-house. From that time to the present almost yearly do we have some "newly discovered" principle for the keeping of fruits. I read them all, and believe what—I do believe. I remember a fruit-house, room, or cellar, as you may call it, that I once knew. I will try to describe it, and at the same time I assert here that I ate fruit from it with as much relish as gathered from the trees the same day in October, the same fruit from the same tree of the year before. I have no patent for the building, and you, reader, may do with what I here write as you please. But to a description:

First—A level piece of ground, from whence water could be readily drained at a depth of five feet, was selected. The measurement was thirteen feet by twenty-one, and this was dug out with a straight bank all around, four feet; seven-foot posts of four by four-inch stuff were placed at the corners, and two between the corners on each of the longest sides. Before these were set up they were boarded on what was to be the outside, with inch boards. The roof

had a ridge, giving one-third pitch, and one end had a door three feet wide, and both had ventilators of three by two feet in the apex: posts of four by four scantling were set accordingly. Before the roof was put on the frame was lined inside with inch boards, and filled—*packed*—with sawdust; the ridge pole, two by four, with plates corresponding, were placed, and on the under side were half-inch boards nailed to them, leaving a space of four inches in and between the roofing, which was filled with sawdust, and then inch boards, projecting one foot over the eaves, broadly battened, formed the roof. Next a floor of inch boards was placed at the height of seven feet, leaving a trap door in center hung on hinges, with a pulley rope to raise or lower it. Double doors at one end were built, the passway being left three by eighteen feet, and on the sides and rear end shelves were made, commencing three feet from the ground, a shelf every six inches, of boards four inches wide and half inch thick, leaving a space of one-half inch between each board of the shelf, and finishing by a two-inch strip edgewise on the front of each shelf. This completed the inside, the lower three feet under the shelves being left for storing baskets or barrels of fruit as brought in, until they could be arranged. Before any fruit was placed upon the shelves, a clean white paper was spread—the first tier laid, another paper over, another tier and another paper. No two apples or pears or peaches or plums touched each other.

Now as to the outside finish. I have said double doors were made, and this means one door inside of the other three feet, the inner door having glass in it to light the room when looking over the fruit, if necessary on account of cold. The ventilators in the apex of each end were arranged to be opened or closed by a pulley cord from the outside. The earth taken from the base was banked up all around the house, walls being built to admit of the steps down to the entrance. A thermometer was kept, and unless carelessness occurred in opening it on a cold day, it was never below 35° nor above 50° .

The cost of such a building to-day probably would be fifty to sixty dollars. It kept fruits then, and I see no reason why such an one should not keep them again.

F. R. ELLIOTT.

HINTS FOR THE FLOWER GARDEN.

FLORICULTURE ON THE FARM.

The following is from a discussion on one of the evenings of the New York State Fair:

The second discussion of the evening was opened by a brief paper by Mr. James Vick, in which he strongly urged upon all farmers the advantages and the duty of devoting some portion of their land to the culture of flowers, as an efficient means of mental improvement to themselves, and an indispensable assistant in keeping the children at home and making them love the country.

Mr. Green repelled the insinuation that farmers do not love flowers. The

reason that they are not more grown is that the country is new, and few have capital enough to gratify their tastes.

Another gentleman said it needed very little capital to indulge a taste for flowers. A dollar, or even less, will make a fine show.

Another formerly owned a farm on which was a little flower garden that had borne flowers enough to take thirty dollars in prizes in a single year. The place was sold, and the purchaser plowed up the flower bed for early potatoes, being "handy by" the house, where his family could conveniently hunt the bugs. The yield was three barrels, which brought him just three dollars and fifty cents! And the influence of the two crops on the children of the respective families, was also widely different, as may be imagined.

Other speakers said that farmers generally do love flowers,—at least as much as city people do,—and floriculture on the farm is rapidly on the increase.

President Barry thought the average farmer of Western New York does not his whole duty in the way of embellishing the surroundings of his home, which are often the most unsightly portion of the whole farm. There should *always* be a lawn. He has seen many a home where young ladies would be trying to play croquet where the grass was three feet high, and a small patch at that, and the young men of the family were off somewhere after a horse that will trot in 2.40. If the farmer would elevate his calling, politically and socially, to its proper position, he must begin with the surroundings of his family. Farming is hard work, but it need not be drudgery.

An old gentleman over 70 years of age, thought the farmers had been slandered,—did not believe there are ten farms without flowers between here and Seneca county, where he lives. There is not *one* within five miles of his own place.

Mr. Hoxie, of Oneida, denied that farmers as a class were less interested in flowers than most city residents. In most rural neighborhoods farmers and farmers' wives and daughters interchange flowers, and have done so from the first settlement of the country, when only the simple, old-fashioned flowers were grown. He recommended the cultivation of a taste for botany, and a heightened appreciation of the manifold beauties of insects, also.

MANAGEMENT OF FLOWERS.

"I believe I take more pains with my plants and flower borders than any of my neighbors, and have the poorest luck. I cannot understand it, but my plants always look sickly and my flowers are always scarce, while others that seem to take little or no trouble over theirs succeed admirably, and it is just unaccountable."

This remark was made to the writer not long ago, and it is but a single case among hundreds of others quite similar. The fact is, plants and flowers must be loved to succeed well. One must enjoy a plant so well as to study its wants and habits, and supply just what is needed at the right time to make them do nicely.

The lady who made the above remark takes pride in having flowers, and orders a great deal of care given to them, but the same mechanical treatment is given to each one, which will never do, any more than one suit of clothes will

fit a whole school of children. Dead things can be molded and shaped according to pattern, but when one comes to care for anything with the principal of life in it, there must be some appreciation of the peculiarities of that life and the conditions under which it will best thrive.

S. Q. LENT.

SUNKEN GARDEN BEDS.

It is very common for a young couple who have just taken possession of a home to themselves, and who wish the whole place to look as bright and comfortable as they feel themselves, to plant some of the showiest flowers they know of in the neat bit of lawn which forms the base on which their pretty, newly-furnished house is nestled. And cynical indeed must be the temper that would do anything but sincerely admire and commend such a fit and innocent adornment of a happy home, that is a true source of happiness itself, and reflects more or less enjoyment on every healthy-minded passer-by. There are fresh beginners always coming forward, beginning a life, the happiness of which will greatly depend upon whether home can be made and kept more enjoyable than other places, and it is to aid in preventing one of the little disappointments that, like injurious insects, come creeping in to annoy and destroy, that this paper proposes to offer a bit of advice.

Beginners are apt to mound up a bed for their flowers so that the beauties may display the better. But this plan is scarcely used even in the humid climate of England excepting for succulents, etc., that can endure very dry soil; and here, under our fierce sun and parching, baking winds, it is impossible to supply moisture to a mound even by assiduous daily watering; and the result is that not only are plants and hopes lost, but disappointment, disgust, and determination never to take so much trouble again for such ungrateful subjects, all set in and take fast root in the vexed mind, spreading their baleful influence over other things.

A method of making a bed which will secure such a growth of the plants as to insure their attracting notice and admiration, is to dig the center very deep, say two feet, and fill one foot with stones or sticks for drainage; set on this a water tub about eight inches deep, which may be sawed from a fish-keg or similar vessel, say two feet in diameter. The top of the tub will be four to six inches below the general surface, and may be rimmed with short green moss from a locality reached by the sun. The soil around is gently sloped downward to the tub, and planted say with verbenas. The moistened air of this little dell, and the degree of shelter afforded from winds, will promote health, luxuriance, and brightness, just as much proportionately as we see in a mountain dell compared with the foliage, growth, and bloom on a wind-swept plateau or mountain crest. The water can be kept pure and bright by occasionally taking out a plug that will reach above the surface in the center, letting off the stale water, and filling with fresh.

In connection with this concavity of form, it may be added that where a garden path is asphalted, as is now frequently done because of its many merits, it is best to let the walk be highest at the sides instead of low, as is usual. Then, with deep coping at the sides, and especially with a good understratum of stone for drainage, no moisture gets under the composition, even in the

wettest winter weather, and consequently frost does not lift even the edges of the walk, or break it anywhere.—*W., in Country Gentleman.*

MATCHING COLORS IN THE GARDEN.

There are few persons with an eye so well trained that they can match or arrange colors so well as to give a pleasing and highly artistic effect. This is especially the case when the attempt is made in the flower garden, where the various shades of leaf and blossom are brought out to their fullest extent. While it would be difficult to give explicit directions for grouping and massing plants to suit every locality, still the following brief rules and remarks on the subject, from the *London Garden*, may be of some assistance to our readers:

Many who can grow flower garden plants to perfection signally fail in making a display in accordance with good taste. For this many reasons exist, notably an unacquaintance with the laws relating to color, and sometimes a want of acuteness in distinguishing between the different colors. What are called primary colors consist of red, yellow, and blue, and of these all others are simply combinations. Thus yellow and red make orange, yellow and blue make green, and blue and red make purple, and so on. Now, as the primary and secondary colors should be arranged alternately, a secondary should always be opposed to a primary. For instance green should be exactly opposite red, and purple opposite yellow. Now, green is the complement of red, and purple is that of yellow. This may be proved in another way. Take a sheet of clean white paper and make a blotch of red in the center of it the size of a penny. Gaze steadily at the red blotch for a few seconds, and then suddenly shift your gaze to a clean sheet with nothing on it, and a disc of green will appear. This is why we call green the complement of red, and green and red always look well in juxtaposition, whether in a flower garden or elsewhere. This is one reason why the old Tom Thumb *Pelargonium* held favor so long. Its leaves were a beautiful green, and one fault in many of our scarlet bedding plants is that their leaves are not a beautiful green, but often spoiled by dark zones.

I have little doubt that the rising popularity of bedding *Violas*, in one sense at least, is owing to the fact that one class consists of purples and the other of yellows—purple being just the complement of yellow. I have a narrow border which was planted last year with one row of *Golden Gem Viola* next the gravel, and behind that one of *The Tory*, and this simple arrangement was admired by every one who saw it. The colors were complementary and true to nature; it was, therefore, consistent that they should please. Blue and white, either in lines or mixed, always look well. White, however, is not a color, and will bear placing anywhere. The same may be said of black, though it cannot be so appropriately planted anywhere. However, we have no real blacks either in flowers or in foliage. The nearest approach to black which I have seen is in *Pansy Bismarck*, and that is not suited for bedding. The *Perilla* and *Dell's Beet* are bronzes, and have to be complemented according to the shade which they present. In the planting of single beds, people who understand the laws relating to color often plant, say, three colors, a central mass, a belt round that, and an edging. I have frequently seen the mistake committed of placing a strong color in the center, the band a complementary color, and the edging in harmony with the band.

Now, it may seem that nothing can well be urged against such an arrangement, as such a bed is planted in accordance with the laws of color. This is to some extent true, but such a bed will always be inferior to one planted on exactly opposite principles. In such an arrangement the center and the band encircling it monopolize the vision, and the bed seems much less than it really is; the edging and boundary line is vague and indistinct, and it requires an effort to comprehend the whole. Planted the other way, the effect is exactly the reverse. When the center beds of a design are arranged in harmony with each other, and the outer beds consist of complementary colors, the central effect is agreeably subdued, while the outlines of the design stand out in bold relief, and with a distinctness not otherwise attainable. In the case of a single bed the effect is similar. Many, however, plant yearly with only one end in view,—the filling of the beds,—and no matter how great the medley, if the plants grow well they are content.—*Rural New Yorker*.

FLOWER BEDS.

One of the most beautiful things that can be made in the flower-bed line is to sow in a cut space in the lawn a bed of double Portulacca. The flowers will not all come double, but every single one should be picked out before it seeds, and allow only the most beautiful ones to perfect the seed. The same ground will be self-sown from year to year, and if the selection is carefully attended to will grow finer with the years. The reason for cutting a bed out of the lawn is that the flower becomes an evil, and a very troublesome one, in the garden, and the safest way is to hedge it in and away from cultivated land. Such a bed is, during all the summer season, from eight or nine o'clock until afternoon, a perfect glory of beautiful color. S. Q. LENT.

SUMMER CARE OF GARDENS.

Under the above title Wm. Falconer, Superintendent of Botanic Gardens of Cambridge, gives the following excellent hints:

Well, looking to our gardens just as they are now (mid-June) let us see what they contain or may contain, and how we may enhance and perpetuate their beauty and desirableness. First of all rigid cleanliness is imperative.

GRASS.

If we have grass lawns, walks, verges, or banks, they should be frequently cut over with the mower or scythe, but in the event of drouth it is better to delay mowing, particularly in the case of banks, and merely switch off long straggling grasses and weeds with the sickle; for if frequently and closely cut, the banks will get sunburned. Grass edges should be sheared after every mowing.

WALKS.

If the walks be of gravel or coal ashes, they will need frequent cleaning, and rolling if practicable, but if asphaltum, sweeping will suffice.

SCUFFLING.

Deny a place to weeds in the borders, and no matter how clean the ground may be, the plants are profited by weekly scuffling the soil, thus retaining moisture and withstanding drouth, admitting heat and preventing baking and cracking. If you scuffled yesterday and it rained last night, but is dry to-day, scuffle again to-day—it will pay you.

RAKING.

Fine raking is worse than useless. The rake is good enough when lightly run over the ground to level it and clear away any rubbish, and thus leave all neat and tidy, but its further use cannot be recommended.

STAKING.

Vegetation is now growing so rankly that it needs timely staking, or disfigurement will result. Rains and wind batter, break and prostrate, and no matter how nicely we may stake our plants after their being thus affected, we cannot erase their uncomfortable look. Bad staking is worse than none, for it is ridiculously hideous to see a dahlia's laterals and stems, a massive specimen of *clematis recta*, a big poppy or peonia, or a clump of tall *thalietrums* bundled around a single stake like a blanket round a lamp-post or a sheaf around a pump. Tall-growing plants like hollyhocks require strong, straight stakes some six feet high above ground, dahlias and delphiniums four feet, and other plants just according to their size, weight and local growth. One stake is generally sufficient, but if the clump be large, two or more may be used, just as discretion demands. Stakes should be applied long before actually wanted, and inserted so as to be pretty much hidden. The ligatures should be imperceptibly fastened, crushing no leaves, and holding only the main stems or branches, all minor ones depending loosely. In applying two or more stakes to one plant, the clump should be parcelled off, and a little practice in tying can make it appear as one undivided specimen. Clumps of *veronicas*, *asperulas*, and some *campanulas*, are apt to be thrown open by wind or rain, but if three or four stout, short stakes, thus, : : with a string run round them, be applied when the plants are only a few inches high, there will be little or no prostration, but, instead, a spreading and depending of the head, like a vine hanging over a fence, and thus we have a perfect cushion of blooms. Timely staking, timely tying, and neat, but strong ligatures, not too tightly fixed, are one of our mainstays in good gardening.

THINNING.

It is often necessary to thin out plants, and better to do it just after growth begins than when gaps would occur. A dozen stems to one hollyhock are not so good as three; therefore rub off as surplus the weakest. In fact, no matter what the plant may be—*Spiræa*, *Veronica*, *Monarda* or *Pentstemon*—if it be vigorous and large, it is much better to thin out the weaker growths, and thus strengthen the stronger and the plant's constitution generally, than to let all grow unchecked to choke one another. This is just the equivalent of summer pruning in trees and shrubs.

PROLONGING THE BLOOMING SEASON.

It is often desirable to prolong the flowering period of our plants, and some are very tractable in this way, particularly such as sucker determinedly, and

those that produce quantities of blooming laterals. For instance, if we pinch off the points of columbines when they are three inches high, they will push again and bloom a week or two later than they otherwise would; but if we let them come into bloom and then pinch them over, we may wait a year for other flowers. Delphiniums may be pinched once or twice, and retarded several weeks. Liliaceous and iridaceous plants will not stand such treatment, but composites and labiates are especially accommodating. The chief points are, pinch early (indeed, it is better to repeat pinching than to delay too long), and, if practicable, pinch when it rains or immediately afterwards. Early-season or spring-flowering plants should not be retarded in this way, because disappointment might result; it is most applicable in the case of summer and fall bloomers.

AN ATTRACTIVE FLOWER GARDEN.

I want to say a word to those who cultivate annual flowers—that it is much better to buy seed of separate colors than mixed, as you will get more beautiful flowers, and it is not necessary to buy many colors to make a good show. Of *Phlox Drummondii*, scarlet and white are all you need. Plant three white ones to two of scarlet; the same may be said of ten-weeks stocks; carmine or rose color and white will give better satisfaction than you can get from mixed seed. Of *Zinnias*, you can use more colors to advantage. I plant scarlet, orange, salmon, purple, and white, but always buy separate colors, and plant them in form of a hedge, one foot apart. *Verbenas* are indispensable to a good flower garden: plant some seedlings, and, if you live near a greenhouse, you can buy pot plants of scarlet and other colors, half of which should be white. Of *Asters*, I use the New Rose Imbrique pompon, Victoria, and two colors of the Cocardean, carmine and blue, each with white center. Be sure to get a paper of the New Rose white, as this is one of the best in the list. Plant plenty of *Delphinium* or *Larkspur*, and have little hedges of white rocket Candytuft, planted at different seasons, to always have it in bloom through the season. If the above rules are followed and seeds are purchased of a trustworthy seedsman, you will have the satisfaction of an attractive flower garden—*N. Y. Tribune*.

DECORATIVE PLANTS.

PALMS AS DECORATIVE PLANTS.

Palms are among the most useful of plants for general decorative purposes, and although their value is well understood in Europe, they have not been generally employed in this country for various reasons, one of which is their supposed gigantic growth and fancied difficulty of cultivation within reasonable bounds.

I shall give a few hints for their cultivation for room decoration, for hot-house, and for summer decoration outside, for each of which they are both useful and ornamental.

Until within a very few years all of the species were imported from Europe in the shape of young plants, and although these plants travel better than do most species of plants, yet there were many losses, and these, added to the freight and duty, increased the price very considerably; but of late years many florists have imported seeds and raised a large number of plants themselves, so that at the present time some species are sold in this country for less money than in Europe; the only difficulty being that the seeds alone are not sufficient for botanists to distinguish the species, so that we often see a strange confusion of names in a lot of plants obtained in this way. When the plants have developed their perfect leaves, it is easy for any one having a knowledge of this class of plants to rectify any mistakes.

Many of the species are natives of the hottest parts of the world, and of course are only fit for hot-house decoration; from growing under the shade of more lofty trees, these will not stand the hot sun without the leaves becoming discolored, and must therefore be grown in the shade. In this class I may name *Geonoma pumilla* and the *Carludovicias*, although the latter are not true palms, but from their palm-like growth are usually included among them. From the fibre of the *Palmata* variety the well-known Panama hats are said to be manufactured. *Demonorops*, *Bactris*, *Calamus*, and several others of their section are furnished with very sharp spines, in some instances, on the leaves, as well as on the stems, which makes them rather unpleasant to handle. All the spiny species which have come under my observation require a strong, moist heat at all times, and are of no use for outside decoration, although many of them are among the most beautiful.

For furnishing rooms, and for outside decoration, the same species are employed. These include the *Livistonas*, the type of which is the well-known *Latania borbonica*, which is one of the most useful varieties, being of free growth and very cheap, and also handsome when well grown. The *Seaforthias*, or, as they are now more frequently named, the *Ptychospermas*, are also very handsome and hardy. The various species of Date palm or *Phoenix* are well adapted to this purpose, and the *Raphis flabelliformis* is one of the best window palms grown; it is of moderate and compact growth, and will stand the dry air of a room better than most plants. The *Areas* are among the most handsome palms grown, and are excellent for this purpose; *lutescens*, *rubra*, and *verschaffelti* are three of the best for all purposes. The *Chamædorea* and the *Corypha australis* are also very useful; the *Chamærops*, with the exception of *C. staurocarantha*, are fine and nearly hardy, but of slower growth than many other palms. It must be remembered that all the palms require an abundance of water both indoors and out, and that if they are allowed to become dry the foliage turns yellow, and the ends of the leaves die.

Those plants intended for outside decoration must not be grown too warm during the winter, or they will receive a check when removed to the open air, and the plants must also be carefully taken up before frost is expected. As these plants should be grown slowly during the winter, a cellar is not a good place to keep them, and although some sorts might live under such treatment they would be sure to suffer.

As single specimen plants on the lawn, few equal the palm in beauty, and if the plants are grown in a cool house, the winter will seldom do them any injury.

Many species may be grown as room plants until they become too large for that purpose, after which they can be planted outside during the summer, for many species do not develop their full beauty until of a tolerably large size. When grown in rooms, the foliage should be frequently brushed to remove dust.

JAMES TAPLIN.

THE IVY.

Why is it that every one is pleased with the common ivy? There is a charm about that plant which all feel, but none can tell why. Observe it hanging from the arch of some old bridge, and consider the degree of interest it gives to that object. The bridge itself may be beautifully situated; the stream passing through its arches clear and copious; but still it is the ivy which gives the finish and picturesque effect. Mouldering towers and castles, and ruined cloisters, interest our feelings in a degree more or less by the circumstances of their being covered or not, by the ivy. Precipices, which else would exhibit only their naked, barren walls, are clothed by it in a rich and beautiful vesture. Old trees, whose trunks it surrounds, assume a great variety of aspect; and, indeed, it is a most important agent in forming the beauty and variety of rural landscape. And it is as useful as it is beautiful; the ivy is of vast advantage to the smaller birds, as it affords them shelter in winter, and a retreat for building their nests in spring and summer. It is in fructification in October and November, and the sweet juice which its flowers exude, supports an infinity of insects in autumn, while its berries are a store of nutriment for many birds in early spring.

CLEMATIS JACKMANII.

This species of *Clematis* affords an other instance of the fact that enthusiasm of plant lovers for new and more perfect forms may at times become excessive, and the enthusiast find himself returning with a renewed fondness to older varieties, possessing certain qualities that cannot but please, in spite of their apparent want of novelty. The skill and enterprise exerted of late years in hybridizing and otherwise obtaining new varieties of *Clematis*, deserve all praise, and have resulted in adding a large collection of most beautiful climbers wherewith to decorate our porches, or to afford an equal delight when trained on stakes to assume the appearance of shrubs or "pillars" of flowers.

But after admiring all the improved varieties, we are still able to come back to *Clematis Jackmanii*, with much of the feeling we have for a friend of tried character. There are better varieties of *Clematis* as regards showiness of flower, but hardly any which present a higher general capacity for ornamentation. It is vigorous, hardly any more so, for the refining process of improvement by hybridizing is not apt, according to present methods, to strengthen the constitution, or increase vigor. The healthy luxuriant foliage of *Clematis Jackmanii* is of a fine dark green, that renders it an attractive climber independent of the flowers.

The flower itself is of good size, although by no means as large as many later varieties; but its color is most charming. With a general hue and texture of

blue or purple velvet, the base of the sepals takes on a more violet tinge, especially under strong sunlight. The width of the entire flower is often five inches, and down the center of the sepal extends a bar, while the whole is relieved by a broad, central tuft of pale green stamens. Equally striking is the great profusion of flowers borne during parts of June and July, with the effect of almost hiding at that time, all foliage, which, as already remarked, forms so notable a feature in the usual appearance of the plant.

This luxurious development of flower and leaf may, of course, be enhanced by adopting the proper system of pruning. The pruning, however, is very simple, consisting merely in cutting back the old wood to short stems of a few inches, in order to renew every year a vigorous young growth, which may be depended on to bear flowers freely, and produce abundant, but not far-reaching foliage. This quality of bushiness renders it peculiarly fitted for covering with bloom and foliage any stump of moderate dimensions, or training into the curious and beautiful "pillar" forms. The hardiness of *Clematis Jackmanii* is unquestionable; an assertion not to be made safely concerning some other choice varieties when brought to our climate.

Therefore, while welcoming and urging the most extended employment of all kinds of *Clematis*, affording, as they do, a continuous series of flowers throughout the entire growing season, we would at the same time deem any collection very incomplete without *Jackmanii*. It will be a long time before any new varieties can entirely supersede it, or make it other than a leading kind—for the simple reason that a plant with a high general average of good qualities, must always retain a recognized value, even among companions evincing greater perfection in single traits.

S. PARSONS.

BEDDING PLANTS.

SEDUMS AS BEDDING PLANTS.

Sedums are choice, hardy bedding plants, and the more they are known the more their beauty is appreciated. Silvery and variegated in their foliage, glossy in all their shades at any time of the year, bedded among a mass of rocks or broken stones on which our wild mosses will grow, they are, winter and summer, a collective mass of flowering plants hardly equaled. They bloom from early spring till late autumn, and once planted no more care is needed. When planted with medium-sized boulders mingled in the soil of the bed, they will bear great heat or any amount of rain without injury.

Of varieties they now number over forty, but we shall only name a few that we know, giving at the same time their period of bloom and color. As edging border plants, and as plants for vases in the house, they are among the best, where no extra care can be daily given. A bed of them made as we say, will be more beautiful year after year than the best of verbenas or phlox drummondii, and once made, the plants and bed are there; no renewal needed. Now to varie-

ties,—leaving out the specific name of *Sedum*,—and giving the name only of the variety.

“*Acre*” is a dwarf, but a strong, close creeper, and a yellow flower all season, that at once gave it the name of Gold Dust Plant. “*Aizoon*” has large and long foliage, yellow flowers in June. “*Album*” has small foliage, pure white flowers in June and July. “*Atropurpureum*” has dark red foliage, and flowers in August and September. “*Pallidum*” has flowers of a pale reddish brown in July and August. “*Carneum variegatum*” has variegated foliage. “*Reflexum*” is very dwarf, flowers of straw color in June. “*Elegans*” and “*Ewersii*” both have small foliage and yellow flowers in June. “*Kamtschaticum*” is lance-leaved, flowers in June and July. “*Villosum*” is very dwarf with white flowers. “*Sieboldii*” has rose flowers in August and September. “*Sieboldii variegata*,” like *Sieboldii*, only its foliage has its edge of a creamy yellow. “*Telephium*” has dark red luxuriant foliage, with pink flowers in August and September. “*Telephium albifolium*” has light foliage with red flowers in August and September. “*Telephium purpureum*” has flowers and foliage of a purplish violet tinge; blooms in August. “*Cruceatum*” has light foliage with white flowers in July. “*Hybridum*” has small foliage, with pale yellow flowers in July. “*Populifolium*” has creamy white flowers in August and September. “*Robustum*” has a curious-shaped foliage, flowers in June. “*Rodigasi*” is new; said to be fine. “*Fabaria*” has large heads of white flowers in August and September. “*Azureum*” is a free spreading sort, with flowers of a bluish or violet shade. “*Purpurascens*” is one that should be grown in the center or back ground of a bed; it is purplish and blooms in July.

Some of the *Sempervivums* and the *Echeveria*, also, are valuable to mingle in a bed of *Sedums*. They are mainly of note from their broad distinct foliage.

F. R. ELLIOTT.

VERBENAS AS ANNUALS.

I have been very successful with verbenas treated in this way, says a writer in the Garden. I purchased seeds of the auricula-eyed varieties, but instead of treating them as hardy annuals I sowed the seed in pans at the end of February, placed them in a mild hot-bed, and when the seedlings were large enough to handle I picked them off into other pans, and returned them to the hot-bed until they were well established. I then gradually hardened them off, planted them out in beds at the end of May, and I was never better pleased with any plants which I ever grew. Their colors were varied and rich, and I do not know of any other flower that would have made so gay a bed as these auricula-eyed verbenas. I consider beds of mixed seedlings, kept well-pegged down, to be preferable to beds of any one particular kind or color. This is the way to secure good showy plants. In consequence of the continued deterioration of the constitution of the verbenas, and the attack of the rust, they are more difficult to grow from cuttings than formerly. Raising from seed for a time may give a stronger race of plants than we have had for some years past.

SUMMER TREATMENT OF PANSIES.

One of the great difficulties in raising pansies from seed, is, our hot, dry, western summers. This favorite flower requires to be kept as cool and moist, as possible, and to this end, those who grow them, should use such means as they possess to fill these conditions. Allowing that the seed has been sown from the first to the middle of May, in rich, warm, sheltered soil, they should be transplanted after they had made sufficient growth for the purpose, about three inches apart, where they may stand until they become pretty stout plants. Then they should be removed to where they are finally to bloom. To get the best results, however, the soil should be kept cool with mulch, or shaded from the hot sun, and water ought to be given in a dry time.

If it is inconvenient to transplant twice, they may be set in their final bed at the first transplanting; but, they make finer plants if removed twice, as we have directed. It is perhaps unnecessary to say that they should be kept quite free from weeds. If lice or other insects attack them, a thorough syringing with strong soap suds, or a suds of chrysalic soap, would be better, followed in a day or two by a syringing with pure water.

Pansies are not considered hardy in the west, but if you cut them back in September, and protect them through the winter with a good mulch of hay, covered with stable manure, they will generally come out nicely in the spring. A better way is to lay evergreen brush over the bed, and cover this with coarse stable manure. This will keep them perfectly, and they will give you satisfaction in the spring. If placed in a cold frame well banked up, giving air in soft weather, and kept covered from frost in hard weather, they will give considerable bloom in winter.

If the seedling plants have been started in a cold frame early in the spring they will give some bloom in the fall, when they may be wintered as before directed. Thus a little attention to detail will enable you to have not only these, but many other nice things, costing but a little time and labor, the most of which the female portion of the household will gladly attend to.

THE BALSAM.

We can heartily endorse the following, from the American Cultivator, in favor of the Balsam. Properly pruned, it is one of the most showy flowers of the parterre:

Notwithstanding the great beauty and general attractiveness of bedding plants, which have been introduced so extensively within a few years for the decoration of the garden, the annual flowering plants are still held in high estimation, and some of them are among the showiest objects of the garden. It is, in fact, but a short time since the balsam, the coxcomb, and the aster were prominent objects of culture, and, with a great variety of other annuals, rendered our gardens attractive the whole season. Easily grown and comparatively inexpensive, they were the flowers for everybody. But, upon the introduction of the bedding system, the old annuals began to be somewhat neglected, especially the less showy kinds. The balsam has, however, from its great beauty, retained its place, and in consequence of the improvement in the size, form, and coloring of the blossoms, has become a most popular and splendid

plant. The flowers are now as large and as double as the rose or as perfect as the camellia. The German florists have devoted much time to the perfection of the flowers. We should hardly recognize the old balsams of twenty years ago in the superb double blossoms of to-day.

The balsam is an East Indian plant, and requires plenty of heat to bring it to perfection; hence it cannot be well grown in the cool climate of Great Britain only in pots under glass. With us, however, it is one of most rapid growing border plants, flowering abundantly from seeds sown in the open ground the latter part of May. To have them in greater perfection the seeds may be planted now in a hot-bed, and as soon as large enough potting them off into small pots, shifting once or twice, and planting out in the border in June. The soil should be rich to produce good, strong spikes of large and perfectly double flowers. English cultivators, who pride themselves on producing the finest double blossoms, never use seed unless three years old; fresh seed, they say, is more likely to produce only semi-double or single flowers. Few plants add more to the beauty of the flower border than the double balsams, and those known as the camellia-flowered are the most esteemed; they are beautifully blotched and spotted or striped like a fine carnation.

CUT FLOWERS.

SUCCESS WITH FLOWERS.

Some people are never successful with flowers, while others are uniformly so. There is such a thing as too much care, and it is equally as injurious as too little. We know of one lady who was always seeking advice about the management of this and that flower, and always took everybody's advice, until all her flowers perished. Then she tried again, using her own judgment, assisted in a general way by a standard work on the subject; her success has been all that could be desired since. Some water too much. No rule about supplying water can be laid down—except the general one—water whenever needed. This leaves it to the discretion of the grower, and the habits of each variety must be closely observed, to be successful. It is a great accomplishment to be able to bring out all the rich beauty of a flowering plant—a greater one than to be able to make an imitation in wax, or even in water colors or oil.

INFLUENCE OF A PLANT.

A little plant was given to a sick girl. In trying to take care of it the family made changes in their way of living. First they cleaned the window, that more light might come to its leaves; then when not too cold they would open the window, that fresh air might help the plant to grow. Next the clean window made the rest of the room look so untidy that they used to wash the floors and walls and arrange the furniture more neatly. This led the father of the family

to mend a broken chair or two, which kept him home several evenings. After the work was done he stayed at home instead of spending his leisure hours at a tavern, and the money thus saved went to buy comforts for them all. And then, as the home grew attractive, the whole family loved it better than ever before, and grew happier and healthier with the flowers. Thus the little plant brought a moral as well as a physical lesson.—*The Sanitarian.*

THE WAY TO CUT FLOWERS.

The florists employ a pair of scissors, with which the stems are severed. But a writer in the American Garden says that the flowers never should be pulled off,—nor should the stems be severed with scissors, but cut off with a sharp knife. The best time for cutting flowers is immediately after sundown, unless to preserve them from a storm, which would otherwise destroy or prevent their being cut in the evening. On cloudy days the time of cutting is a matter of much less difference. The explanation of these rules, as to the proper time for cutting, is found in the state of the sap at different times of the day and night. From the earliest dawn until sundown, the leaves are actively drawing upon the roots, and the sap is flowing freely. After that time the leaves are nearly dormant until morning. The plant is then resting, is asleep. A flower cut in the sunshine will wilt at once, and if not put into water, will quickly perish, whereas, if cut at sunset, it will remain fresh all night. In a cool place it will not appear to change for a long time, even if not put in water; yet, in a close, hot room, it will fade in an hour. The usual manner is to cut all flowers with a long stem. Unnatural as it may seem, the true way (for the greater part of our flowers) is to remove them without a stem. Roses should be cut with a long stem,—the longer the better, provided other buds are not destroyed. The carnation, and all plants that bear their flowers in clusters, should be removed without stems. The heliotrope should be allowed a very short stem, and the verbenas should only be cut as far down as the first leaf. A bit of wire or a match-stick will serve for a stem if it is desired to make of these stemless flowers a bouquet. If they are to be placed in shallow dishes,—the best way to display them,—the stems are of no consequence. Do not collect flowers in large bundles, or tie them together, as these processes also hasten decay.

CUTTING FLOWERS.

Every house that has a bit of land with it ought to be ornamented at this season with beautiful flowers, for the mantel, the stand, the desk, the dining table, in fact in all the nooks and corners where the eye would be relieved by them. Flowers with short stems may be arranged in plates and keep well, making beautiful table ornaments, with longer stems in bouquets,—and who does not like to see fresh flowers in a lady's hair or at her throat?

In cutting flowers care should be taken not to waste buds while taking those in full bloom. And again, they should be cut off rather than pulled off. Flowers gathered at night, after sundown, will keep better than if taken in the middle of the day. Old flowers should be removed from the beds, and plants will bloom all the better by removing nearly all the flowers in full bloom every other day. The more we cull the more they give, providing we pick discreetly.

S. Q. LENT.

PRESERVING FLOWERS, ETC.

Many flowers and leaves may be beautifully preserved by covering them in every part with melted sperm. The simplest way is to cut a candle into pieces and melt it in an old saucer on the back of the range—it must not be hot enough to smoke. First dip in the stems; the sperm will harden almost at once, so that the stem may be held while immersing the flower or blade of the leaf. Dip but once and that quickly. The process is too severe for delicate petals, melting them as it were together; of others the heat will change the colors. Variegated leaves such as those of the pelargoniums, maples, ivies and fancy-leaved caladiums will perhaps give the best satisfaction. When arranged into bouquets or wreaths they are less liable to curl if protected by a glass globe, like those used for wax flowers; still, if not so protected with a little care in keeping them out of the dust and in a coolish atmosphere they will retain their form and colors for months.

Ferns may be selected any time during the Summer, but one must carry a large book while gathering them. Subject the book to a pressure until the fronds are perfectly dry. It is well then to press them with an iron.

Perhaps the best way to preserve Autumn leaves is to iron them immediately after gathering with a moderately warm iron upon which white wax has been rubbed; iron each surface but once; apply wax for each leaf.

ARRANGING CUT FLOWERS.

To arrange a bouquet, or to dress a vase with skill and taste, is no mean accomplishment, requiring, as it does, a thorough knowledge of the relative value of colors; much taste in producing harmonious blending or skillful contrast; a judicious use of spray and greenery to tone down the brightness, and, above all, a natural aptitude and liking for the work. The composition of every bouquet should form a study; all formality and stiffness must be avoided, and as close an approach as possible to "nature's sweet simplicity" ought to be aimed at. Overcrowding is an error too often met with. I have seen bouquets, so-called, which were a compact mass of roses, and whose entire surface bristled with buds, the only aim of the maker appearing to be the crowding together of as many flowers as possible in a certain space. The advantage of being able to throw a few flowers together quickly and effectively can hardly be overrated.

In selecting flowers for this purpose, too great variety is to be avoided; a few fine blossoms, whose colors are complementary to each other, if well arranged, will invariably afford greater satisfaction than the most complicated composition. It should always be remembered that when two colored surfaces are in juxtaposition, they mutually influence each other—hence the importance of placing side by side those flowers whose form and color are best adapted to harmonize, or contrast. When a person is thoroughly conversant with the relative value of the primitive colors and their complementaries, it becomes an easy matter to effect harmonious combinations of their various shades. Form, size, color and lightness are the leading features to be studied in the formation of a bouquet. A circular and convex form is the most pleasing. But it is in the size of a bouquet that bad taste is often visible. A hand bouquet which is nine inches in

diameter would appear to be quite large enough, but often the tyrant Fashion demands a much larger size.

When we regard the arrangement of the flowers, while avoiding the formal appearance of regular circles, two methods of equal excellence may be pursued. The first of these consists in blending together a number of flowers, with a due proportion of their buds and foliage, whose forms and colors best tend to produce a pleasing whole. The second consists in arranging side by side masses of color, each mass containing three or more flowers of the same kind, and these masses are interspersed with the fronds of ferns or other suitable foliage.

By this method a much bolder effect is secured, while too much formality is avoided. Although bouquets for the hand undoubtedly demand skill on the part of the maker, yet they rank second in importance to the bouquet for the vase, flower-table, or basket. In an arrangement of flowers for this purpose, due regard must be paid to the form of the vessel to be decorated, as well as the place it is to occupy when the arrangement is completed. A large, tall vase for a center table should contain larger flowers and a bolder mass of color than one which is to occupy a position of less importance; but in using strong colors, all tendency to glare or heaviness must be particularly guarded against. Frequently, after dressing a vase, it is found desirable to remove a flower or two at parts which have become so crowded as to appear heavy; for in the arranging of flowers in vases, water only can be used, and as the flowers have no support for their stems, it is at times a difficult matter to arrange them satisfactorily.

F. R. ELLIOTT.

KNACK IN ARRANGING FLOWERS.

A writer in *St. Nicholas*, probably having seen, as most of us have, the wonderful lack of taste generally exhibited in the arrangement of bouquets, gives us the following useful hints on the subject:

Many persons who are lucky enough to have flowers do not at all know how to arrange them so as to produce the best effect, while others seem born with a knack for doing such things in just the right way. Knack cannot be taught, but there are a few rules and principles on the subject so simple that even a child can understand and follow them, and if you will keep them in mind when you have flowers to arrange, I think you will find them helpful. Just as flowers are the most beautiful decoration which any house can have, so the proper management of them is one of the gracefulest of arts, and everything which makes home prettier and more attractive is worth study and pains, so I will tell you what these rules are in the hope that you will apply them.

1. The color of the vase to be used is of importance. Gaudy reds and blues should never be chosen, for they conflict with the delicate hues of the flowers. Bronze or black vases, dark green, pure white, or silver, always produce a good effect, and so does a straw basket, while clear glass, which shows the graceful clasping of the stems, is perhaps prettiest of all.

2. The shape of the vase is also to be thought of. For the middle of a dinner-table, a round bowl is always appropriate, or a tall vase with a saucer-shaped base. Or, if the center of the table is otherwise occupied, a large conch shell, or a shell-shaped dish, may be swung from the chandelier above, and

with plenty of vines and feathering green, made to look very pretty. Delicate flowers, such as lilies of the valley and sweet peas, should be placed by themselves in slender tapering glasses; violets should nestle their fragrant purple in some tiny cup and pansies be set in groups, with no gayer flowers to contradict their soft velvet hues; and—this is a hint for summer—few things are prettier than balsam blossoms, or double variegated hollyhocks, massed on a flat plate, with a fringe of green to hide the edge. No leaves should be interspersed with these; the plate should look like a solid mosaic of splendid color.

3. Stiffness and crowding are the two things to be specially avoided in arranging flowers. What can be uglier than the great tasteless bunches in which the ordinary florist ties his wares, or what more extravagant? A skillful person will untie one of these and, adding green leaves, make the same flowers into half a dozen bouquets, each more effective than the original. Flowers should be grouped as they grow, with a cloud of light foliage in and about them to set off their forms and colors. Don't forget this.

4. It is better, as a general rule, not to put more than one or two sorts of flowers into the same vase. A great bush with roses, and camellias, and carnations, and fever-few, and geraniums growing on it all at once would be a frightful thing to behold; just so a monstrous bouquet made up of all these flowers is meaningless and ugly. Certain flowers, such as heliotrope, mignonette, and myrtle, mix well with everything; but usually it is better to group flowers with their kind,—roses in one glass, geraniums in another,—and not try to make them agree in companies.

5. When you do mix flowers, be careful not to put colors which clash side by side. Scarlets and pinks spoil each other; so do blues and purples, and yellows and mauves. If your vase or dish is a very large one, to hold a great number of flowers, it is a good plan to divide it into thirds or quarters, making each division perfectly harmonious within itself, and then blend the whole with lines of green and white, and soft neutral tint. Every group of mixed flowers requires one little touch of yellow to make it vivid; but this must be skillfully applied. It is good practice to experiment with this effect. For instance, arrange a group of maroon, scarlet, and white geraniums with green leaves, and add a single blossom of gold-colored calceolaria, you will see at once that the whole bouquet seems to flash out and become more brilliant.

Lastly. Love your flowers. By some subtle sense the dear things always detect their friends, and for them they will live longer and bloom more freely than they ever will for a stranger. And I can tell you, girls, the sympathy of a flower is worth winning, as you will find out when you grow older, and realize that there are such things as dull days which need cheering.

THE GARDEN SYRINGE.

A garden syringe gives its possessor continual advantage against dust, daub, and such vermin and fungi as are assailable by water or watery solutions, as a great many of them are. One cannot enumerate all its uses. But let us suppose that we have at hand a good, firm, unbruised brass syringe, with nozzles for throwing either a concentrated column of water, or a rain-like shower, or a gentle spray. In the winter this last is chiefly used because it rinses and bedews the leaves, while it does not drench the roots. The other nozzles come into use now and then for rinsing windows, pots, etc., and as spring advances they are in daily use. Red spiders, thrips, and voracious little bugs that can't bear wet lurk under eaves and roofs and sally forth like grasshoppers from dry

western plains to devour or reduce to network all foliage they can travel to. But they cannot live if the air is kept humidified by evening sheets of syringe showers. These almost invisible vermin are the cause of the loss of an incalculable number of choice plants, which are set out in nicely-prepared and sheltered borders, but directly begin to decline in a way that seems as unaccountable as wonderful to the vexed and disappointed lady culturist who has given them so much attention through all the winter months, and who finds them suddenly pine just when they have all the advantages of free sunshine, balmy spring air, and a choice bed of fine mold.

Plants are often set out in wet weather and the leaves become soiled. This would be detrimental or fatal, but a shower from the syringe makes all right. Some seedlings require so light a covering, or are so weak when they come up, that a flow from a watering pot would be a waterspout torrent to them, as destructive as a river current to a corn field. But the fine spray of the syringe drizzled gently over them is as the dew of Hermon. By the middle of May, roses, vines, gooseberries, etc., are attacked by the ravenous leaf-eaters, small and large, and the Queen of Flowers will become a pitiable wreck and the berries will be worthless if the enemy is not promptly overwhelmed. The syringe will do this alone, if applied forcibly and from beneath, and still more easily and thoroughly with water at 130 degrees, or not over 140 degrees, or with copperas and water, half a pound to a gallon, or soap and water with as much carbolic acid or coal oil, as the soap will cut completely, leaving none floating. These are effective, but the rose bushes should be rinsed afterward with pure water to prevent stains, which would mar the beauty of the foliage nearly as much as the insect ravages. For cabbage worms use hot water with some saltpetre dissolved in it. In using a syringe, never draw the water from the bottom of the bucket for the fear of taking in sand, which would soon wear the bore unevenly, and so do injury that cannot be remedied, but will cause troublesome leakage.—*Detroit Free Press.*

THE VEGETABLE GARDEN.

FARMERS' GARDENS.

With plenty of land and good locations for gardens upon almost every farm, the farmer should pride himself upon his well-kept and productive garden. Do not cling to the idea that you must retain the same old spot year after year, but strike out for some new location, away from the buildings and where the vegetables can be sowed in long rows, and then a horse and cultivator can be used to keep down the weeds,—thus enabling you to save a deal of labor, while you can raise much better crops. If you will have hot-beds enough to start the early plants, you can supply your table with all the choice vegetables of the season, in abundance, and at a comparatively insignificant outlay, and add to the pleasure of your tables and health of your families, as well as save many a dollar that would otherwise go to the grocer and butcher.

AUTUMN GARDENING.

It seems a little unseasonable to plant or sow in the garden in autumn, but market gardeners have learned long since, by experience, that to make their business profitable they must have vegetables in market out of season, and that they make the most profit on truck requiring extra labor, skill and knowledge to produce it. Take, for instance, lettuce. It may be grown so easily after the time for sowing it in the open air, that the low price for which it would sell would not compensate for the cost of growing it, but when propagated by skill, under glass so as to be put upon the market in early spring, it is a paying crop.

There are some vegetables which, sown in the open ground early in September, and properly protected by those having the requisite knowledge, may be perfected so early in spring or summer as to sell at a good profit. Cabbage is one of this class, and if sown about the first of September in good, rich ground, transplanted before heavy frost into cold frames, and properly cared for through the winter, may be transplanted again into the open ground as early as the soil is in condition to work in spring, and will be ready for market before the first of July, when they will generally sell at rates that will pay well for all the labor.

Spinach is another vegetable that can be sown about the first of September, and without any protection will generally pass through the winter with little injury, and be ready for market before the end of April. In some sections they cover it with straw, but we think the gardeners in the vicinity of Rochester seldom cover it.

Potato onions may be set during the first half of September, and will generally keep better in the ground during the winter than elsewhere, and ripen, or attain a suitable size for bunching and selling green, long before those planted in the spring. We have raised onions from the seed from fall sowing, but they are liable to send up seed-stalks before the bulbs have attained the full growth.—*Rural Home.*

HOME-GROWN GARDEN SEEDS.

The "running out" of varieties of vegetables may in most cases be attributed to careless cultivation and improper selection of seed. With due respect to the good intentions of reputable seedsmen, it is still to be said that there are weighty reasons for the belief that prevails among some of our forehanded gardeners that the "home-grown seeds" are of more value than those obtained from the dealers. The man who depends on seeds of his own raising and gathering knows what he has, while he who thinks it "cheaper" to purchase his supplies will frequently be disappointed in the harvest. Much depends on choosing the parent plants. Vegetables can be gradually improved by careful selection and cultivation, while slovenly culture, with poor soil, will cause any variety to deteriorate. We knew a man whose crops were always superior to those of his neighbors, and yet his tillage was the same as theirs. The secret at last leaked out; they begged a little of his seed and were as successful as he. Take, for example, tomatoes. By selecting only such specimens as are perfectly smooth—of a certain prescribed form, large, and of handsome color—

we can gradually improve on the original type; but if we save seeds at random the fruit will deteriorate, no matter how generous the cultivation may be. Every one who has had any practical experience with root crops is well aware of the importance of beginning properly by selecting roots for seed that are in each instance up to the standard of excellence, and that a disregard of this precaution will result, in a few years, in roots of every conceivable shape and texture. But in laying so much stress upon selection, we must not neglect the other important requisite—good culture. Seeds grown on thin, poor soil will show in the next generation of plants a marked falling off in quality.—*N. Y. Tribune*.

BEANS—TIME OF RIPENING.

It often happens that those about to plant string beans would be glad to know just how long it will be before the crop is ready to gather. In our own garden, from records kept for three years past, we find that the first crop, which was put in about the 12th of May, on each occasion was ready to use in exactly fifty-seven days. The second crop, put in about the 4th of June, took from forty-eight to fifty-six days before being ready. The third one was started near the 2d of July, and it was ready in forty-eight days. It will be seen that for the first crop the seasons made no difference, as each year fifty-seven days were required. The second crop varied in time a little, doing the best last year, when the hot summer fetched it in forty-eight days. The third crop takes about the same time, and so probably would the fourth. Attention to these facts will enable any one to bring their beans along in succession without any difficulty. For instance, the first crop, sown May 12, will be ready July 8. Allowing two weeks, as the time the beans will remain fit to use, the second crop should be ready July 22, and to accomplish this must be sown June 2, to give it fifty days. This crop will be ended August 5, and the succeeding one should be put in June 17. Unless the summer be very dry, the different crops will remain fit to use for three weeks, and the sowings need not follow each other so closely.—*Philadelphia Press*.

PREPARED SEED.

Just now we find in our agricultural papers advertisements in which some one offers to sell prepared seed which will germinate in half the time, produce twice the crop, with half the labor necessary for the natural seed. For many years gardeners have known that soaking some seeds in medicated water (notably chlorine and camphor water) has sometimes a remarkable *stimulative* effect, particularly if the seed is old; but this is simply a stimulant and nothing more; and hence, if we use it, the seed must be surrounded by the most favorable circumstances of soil and temperature, so that with this unnatural energy it can immediately and readily obtain a liberal supply of food, or in the reaction we shall be worse off than if we had not used it. Even in the greenhouse the

gardener finds he must take especial pains with this prepared seed; a little too much or too little water, a too high or too low temperature, and his seeds are gone. So he only uses it in cases where he is anxious to obtain plants from doubtful seed. Last year failing to receive turnip seed in season, we were obliged to get some two pounds from the village store, which upon testing we found very poor, not ten per cent starting. As our seed bed was an unusually good one and in the best possible condition, we decided to "doctor" the seed, which we did as described below, and planted with the greatest possible care. That night we had a slight shower, and the third day the seeds broke ground, and on the fifth day we could see the rows so plainly that we ran a harrow-toothed cultivator through them. This gave the turnips the "odd judge," and enabled them to win by an eight to seven vote over weeds and dry weather, all through the season. A single row of unprepared seed treated like the others was very slow in coming and did not gain nearly a full stand, while the other came on so well that our foreman insisted that two plants must have come for every seed planted. The results in this case were all that is claimed by the advertisers. We doubled our crop and diminished the labor *per acre* one-quarter, by soaking the seed—a relative result, however, which only came from the conditions, in the care, very poor seed, favoring weather, a perfect seed bed, with early and good cultivation. We should say, then, that it is only the *good* farmer who will derive any benefit from "prepared seed," while it is the poor one, to whom such seeds are nearly valueless, that will be attracted by the cry of double crops with half the labor, and all by simply using "prepared seed." Different seeds are differently affected, but as a rule we have found camphor water the most available stimulant, and our seed is prepared as follows:

Four or five days before we are to plant, we put plaster four or five times the bulk of the seed, into the brick oven to get as dry as possible. The evening before using we add slowly, while stirring rapidly, spirits of camphor, drop by drop, to about the bulk of our seed of warm water. We continue this until the flakes of free camphor, which are formed as the solution strikes the water, cannot be dissolved, when we add a little more water to dissolve them. Care should be taken that all are dissolved. This is much weaker than the camphor water of the dispensatory, but is quite strong enough. The seed is then added and set in a warm place for about eight hours. We then drain off what water we can, and mix the seed with the dried plaster, made as hot as we can handle it, rubbing them well together. The plaster is then sifted out as *clean as possible*, and there will be no more difficulty in sowing the prepared than the dry seed. Sow immediately, and take the utmost pains to plant the seed well on well prepared ground and give early cultivation, as it is only by combining this with the prepared seed that good results may be expected.

WILL. W. TRACY.

MANURE FOR THE GARDEN.

Root's Garden Manual contains the following excellent practical hints upon garden fertilizers:

Generally I know of no objection to the use of fresh manures, except that if applied heavily they trouble in fitting the ground for fine seeds. On the

contrary, I have always noticed very good effects from the use of long manures, and advise piling manure only when no ground is prepared to receive it. But this period covers a considerable portion of the year and much of it must be piled. If left thus in warm weather without attention, fresh manure invariably fire-fangs—burns up—and loses nearly all its virtues, till it is worth little more than so much chaff. To avoid this, after several days of hauling manure we give it a good drenching with water, and cover with a half inch of soil to help retain the moisture, and to fix all the escaping ammonia. When wanted it is usually short and finely rotted.

Hen manure, when mixed with enough soil to work fine, has special fitness for the onion crop, as it can be applied to the surface where wanted, has no weed seeds, and is exceedingly valuable, being little less than guano.

Leached ashes have an especial value on sandy soils, and produce most effect upon onions, potatoes, corn, and the root crops. Their value is lasting, and the effect of a liberal application will be noticed for years, and if not to be hauled more than three miles their use is profitable.

Unleached ashes have a most marked effect when applied broadcast over onions partly grown—in fact it is one of the most valuable special manures for this crop, and is worth for this purpose twice the amount paid by soap-makers. For all garden crops they are valuable; potatoes, turnips, beets, and peas, deriving most benefit next to onions.

Lime is of most value on rich old soils, its effect being to unlock and release fertility already in the soil, but inactive or insoluble. Hence upon poor soils it may sometimes do more harm than good, but used upon rich old garden soils its use occasionally will produce astonishing results.

Super-phosphate of lime produces a very quick effect, and besides the fertility it adds to a soil, the rapid development it aids in plant life enables the roots to lay hold of much food they would not otherwise. In the garden it is of especial value to hasten growth while plants are still small and unable yet to reach coarser manures, and also to touch up and bring forward any portion of crops which seem to need further help. While depending chiefly on stable and green manures, we always find profitable use for more or less super-phosphate.

In the garden land plaster is exceedingly variable in its effects. Some of the most marked benefits from its use have been noticed upon vines during a drought. If applied over the surface of the hill and vines during a drought so severe that the leaves droop at midday, they will in a couple of days show no signs of drooping, but exhibit unusual vigor. While in this section we sometimes use it without any perceptible effect, in Michigan it tells wonderfully upon clover and generally upon other crops.

Brewers' spent hops are, in some places, so abundant as to be an important fertilizer, generally one load being equal to two of stable manure. But I have found them most valuable, when well rotted, for raking into the surface of seed beds in which are raised cabbage, celery, and other garden plants, since it retains moisture, keeps the surface loose and light, and in every way favorable for the successful growth of plants. In like manner it is excellent for any plot where you wish a most vigorous growth,—those vegetables for the fair, you know.—since it furnishes abundant fertility, while it keeps the soil in the best condition for growth.

VEGETABLE MOULD.

The Gardener's Record in giving directions for the preparation of mould, says: As early in November as the leaves of trees can be collected, let them be brought in a considerable quantity, into a close place, and dressed up there in the form of a hot-bed. Let this be well saturated with the drainings from the dung-heap, with suds from the wash-house, with urine from the stable and cow-house, where this latter article can be procured. Let this bed or heap be covered and lined with fresh stable dung, to make it heat. When the heat is sufficiently subsided, let the leaves be uncovered and turned over to mix the dry and wet together, and if moisture be required, let them have it of the same description, repeating the process till all be reduced to fine mould. This will be ready for use in two months from the time of collecting the leaves. To prevent any waste of the liquid recommended, a layer of maiden earth, of two feet thick, should be made the substratum, which would receive any of the valuable liquid that would otherwise run to waste. Leaves of slow decomposition should be avoided, as those of the oak, etc., which, however, are the best for retaining heat in hot-beds and pits. The leaves of fir should also be avoided, but those of the sycamore, elm, alder, maple, and all the soft kinds are better suited for the purpose. This compost should be kept dry, in an airy place, and ridged up, so that the rain cannot wash out the salts with which it abounds.

WINTER CELERY.

We have seen celery well kept through winter by simply burying an ordinary flour barrel in the ground, mixing in the bottom about nine inches of thin mud, placing the celery upright with the balls of roots in the mud, and covering the tops over with a mound of straw, leaves, or manure. The celery came out finely bleached, and without a sign of shriveling. Experience with many methods has taught us that this is one of the very best for small lots for family use. We have also seen excellent results by placing the barrel in a cool cellar: of course the roots should be bedded in thin mud in this case as well, and it will keep fresh for a long time. In quantity, celery may be stored in trenches, say two feet wide, and of sufficient depth to take all in except the leaves when standing upright. The plants must be packed closely together, allowing a ball of earth to remain on the roots of each; bank up slightly on either side; cover about two feet deep with dry leaves, and place over this a roof-like structure of boards to ward off rain. Water among celery plants during winter is as disadvantageous as during its growing season it is indispensable. Of all materials for protecting the tops and to keep out frost, we have found leaves best and corn-fodder poorest; the latter appears to possess some special attraction for mice, and they will harbor in it in preference to almost anything else. As to location for storing away celery, a hillside in light sandy or gravelly soil is best, and the nearest approach to this will give most satisfactory results. The plants need not be blanched before storing, as old-time gardeners believed; if properly stored they will come out white, crisp, and tender up to the leaves. To have good celery, however, it is, of course, needful that it be well grown; no plan of storing can make amends for defective culture.—*N. Y. Tribune.*

KEEPING SQUASHES.

Keeping squashes in winter seems to be attended with considerable difficulty. They cannot be kept where it is damp, as in most cellars, or where frost can reach them, nor will they keep so well where it is very warm. The best conditions for keeping them seem to be where the air is cool and dry, yet safe from frost. An attic chamber until winter, then a closet near the chimney where the frost cannot reach, or the temperature does not rise very high, is the best most families can command. Extensive market gardeners often keep them in houses built for the purpose, where they can maintain an even temperature by the aid of fires and ventilation.—*Massachusetts Horticultural Report*.

HOW TO DETECT RIPE MELONS.

Let me give you an infallible sign by which to know a fully ripened melon. When the melon begins to change color inside, and its seeds to turn black, a small black speck, scale or blister begins to appear on the outer cuticle or rind. These are multiplied and enlarged as the fruit matures. A ripe melon will show them thickly sown over the surface. A partial development only indicates half-ripe fruit. A full crop of blisters reveals its perfect ripeness. When hundreds of melons are strewn along the sidewalk, you will have to look pretty sharply to find one that exhibits a satisfactory "escutcheon," to borrow a term from M. Guenon. But it is unfailing when found, and by following this guide, you may walk away with your melon with the most entire confidence. The blister is only to be seen upon a close inspection, but is plainly visible when that is given. If you raise watermelons in your own garden, the same rule will apply.—*Country Gentleman*.

WEEDS.

Prof. Prentiss, of Cornell University, recently gave a lecture upon the above topic of pleasing interest. He said that nearly all our domestic animals, our vermin, our injurious insects, and our people were foreigners, and the same was true of our weeds. Of the total 130 kinds 110 are of foreign origin, and only 20 are indigenous to America. Of the 54 "weeds of culture" we find that 42 are natives of Europe, one a native of tropical America, and 11 are natives of the United States, the single arrival from tropical America being pigeon weed, or what is called red root in Michigan. It is a very troublesome weed in that State, but it is not so common here. Besides being hardy and vigorous, a plant to be a success as a weed must be very fruitful, capable of producing an abundance of seed and multiplying itself rapidly. We find that a single plant of our worst weeds is capable of producing from 2,000 to 50,000 seeds.

The Professor furnishes a table giving the number of seeds which a single plant of the following varieties will produce in a season :

Dandelion	2,000	Burdock	24,000
Ox-eye daisy	13,000	May-weed	40,000
Doek	13,000	Red Poppy	50,000

The address closed with the following general hints in regard to the extirpation of weeds. In the first place it is of great importance to use only clean seed. In this respect not enough care is taken. New and troublesome varieties of weeds are often introduced on farms in grass seed or small grains. Seed which seems to be reasonably clean and pure when submitted to critical examination will often be found to contain foul seeds in considerable quantities. Better pay a full price for absolutely pure seed, and be to considerable expense in separating foul seed from seed grain, than sow seed which will cause such endless labor in the future.

As another point to be observed, use every effort to prevent weeds from maturing their seeds. From the figures I have given, showing the immense number of seeds which a single plant will produce, you see the importance of "nipping them in the bud."

Again, weeds which have gone to seed should never be plowed under. They should be burned. Plants, the seeds of which do not seem to be ripe enough to grow, will often have sufficient vitality to mature the seeds after they are cut down, hence they should not be composted.

Speaking of plowing under ripe weeds, I am reminded of what I saw in Michigan a few years ago. Pigeon weed or pigeon grass is a very noxious weed in that State, and yet I remember seeing farmers plowing large fields of that weed under, when by so doing they were simply filling their soil with the pest. When the soil is stocked with seeds they stay there to come up year after year, as they get near the surface or meet the conditions of germination. I knew of a little piece of ground on which tobacco plants were permitted to go to seed. For ten years afterwards plants came up every season from this one seeding. The eleven weeds native to this country are mostly familiar ones, and are known as the dandelion, quack grass, wild pepper grass, flea bane or white weed, five-finger, yarrow, rag weed, yellow rocket, fire weed, beggar ticks or blue marigold, and Rudbeckia, for which no general popular name is given.

"PUSLEY."

"As mean as pusley" is as appropriate a comparison as I know of. It develops in a night from a seed to a weed, and if left for a few days without disturbance it seems to have more lives than the proverbial cat. It will grow wrong side up; it will grow if thrown on the grass, and in moist weather it will grow if hung up on a rail. There are no two ways to fight this miserable pest, with any success. The only feasible method is to take it as soon as it germinates. Ground in which purslane seed has become a large component part, should be raked over every fourth or fifth day, whether any weeds are in sight or not. It seems like a large expenditure of labor, but when we calculate that by doing this we can accomplish five times as much as if we left it three weeks, we can see economy in it after all. And again it is not safe to leave it many days, because in hot weather it will be born one day and in a week pass the period of puberty, in ten days develop seeds that will germinate and form a generation 1,000 times as numerous as the first. Yes, I have estimated with care the production of

seeds from a single plant, and find from a thrifty specimen they number a million.

And with all this in view how few gardeners can see that

A rake in season
Will save a million.

S. Q. LENT.

INJURIOUS INSECTS AND THEIR ENEMIES.

THE CURRANT WORM.

One habit of the currant worm is worth a careful notice, as it is the key to a successful fight with the pest. The eggs are laid on leaves close to the ground, and when they first hatch the broods are confined to a very limited area about the roots of the bushes; if the bushes are examined with care and doctored with hellebore in water, when they first start, it is very little difficulty to overcome them, and saves a good deal of chewing of the leaves.

T. T. LYON.

THE CABBAGE BUTTERFLY.

The light colored butterfly flying along listlessly among the rows of cabbages, apparently so harmless, is not the embodiment of innocence,—it is worse than a tramp. The delicate movements and quiet ways are apt to deceive us into the thought that it is only beauty and harmless innocence that flits before our eyes. But when in a few days we find highways stretching in irregular curves through our beautiful cabbages; when we cut through the head brought in for dinner and observe that we have bisected several disgusting worms, our stomachs with disgust cry out: “From whence came these?” And that same delicately-moulded, soft-winged insect that a few days before executed such graceful movements, if it had lived so long, would wink with one eye at us and say, “I did the mischief, but what are you going to do about it?”

This last question it would be well for us all to ponder over. What are we going to do about the cabbage insect that promises to give us an invasion of no small moment? Prof. Cook says: “Catch the butterflies. Waylay the pupa under boards laid between the rows, and pour hot water on the heads of cabbage to kill the larvæ.” In the meantime it is well to bestir ourselves and learn the habits of the insect, adopt the best methods of destruction, and invent better ones if we can.

S. Q. LENT.

CABBAGE WORM REMEDY.

I will give you a sure remedy for the cabbage worm: Make a strong solution of lime-water, pour it over the cabbage in the evening; if the lime-water is made strong there will be no live worms left that the water touches. Last fall I had a nice patch of cabbage infested with the worms. After trying all other remedies I could think of, I resorted to the lime-water, and, to tell the truth, I expected to find my cabbage cooked next morning, but I was agreeably disappointed to find the cabbage green and bright, and the worms lying all over the patch dead as a door-nail.

WM. RYBOLT.

SURE DEATH TO THE CURRANT WORM.

The destruction of currant bushes for years past by worms has been the means of enhancing the price of that very valuable fruit in most markets, while with a little care it can be cheaply protected. It is a well-known fact that white hellebore is sure death to the currant worm, but at the same time many will not try it, while others apply it in such a way that it is soon washed off by rains, or only touches the tops and outside leaves, leaving the inside of the bunch of bushes for the worm to feed upon. The whole secret is to apply it on the under side of the leaves, where the worm fastens to eat. To do this I take a piece of cotton cloth that the powder will shake through sparingly, about ten inches square; put in about four ounces of the powder, and gather it up around the end of a stick about three feet long, and tie it on, making a sort of bag at the end. I then make the application in the morning before the dew is off by opening the bunch of bushes and putting the bag end down nearly to the bottom and shake it, the current of air is then upward, and the leaves being damp, the powder sticks on the under side. If the current of air is a little sideways, shake low on the windward side on the outside of the bunch of bushes. It is not best to wait the appearance of the worm, but doctor the bushes as soon as the blossoms are well developed and the leaves are half or two-thirds grown, and again after the fruit has fairly set. This will usually do the work for the season. The main point is to rightly apply the hellebore, and with these hints and a careful attention, with the use of a little judgment, the currant bush can be preserved. We have a row about six rods long that we have preserved for over twelve years in fine, healthy condition, producing from \$15 to \$20 yearly, beside what we use, at a cost of care not to exceed \$1 per rod.—*N. Y. Tribune.*

THE TOAD USEFUL.

Toads live upon beetles, bugs, flies, grubs, and all such game. They are easily tamed, and will learn to accompany a weeder about the garden and pick up such morsels as squash-bugs, rose-bugs, cut-worms and potato-beetles, that are known to them. A toad has been known to put away within him over a hundred different kinds of bugs and flies, and then winked for more. Such

services as this surely ought to be recognized, and such a servant accommodated with both board and lodging in the garden. No animal is less offensive or minds his own business more closely. This valuable habit may perhaps be considered as "the jewel" which the toad has been said to carry in his head. The toad is one of our valued assistants, and should by all means be encouraged. The common idea that to touch a toad will produce warts upon the hand is unfounded. It is in no way disagreeable except to dogs, which desire to try their teeth upon it. In this case an acrid juice exudes from the skin, which is disagreeable to the dog, but not injurious.

SINGULAR PROPERTY OF TOMATO LEAVES.

"I planted a peach orchard," writes M. Siroy, of the Society of Horticulture, Valparaiso, "and the trees grew well and strongly. They had just commenced to bud when they were invaded by the curculio, which insects were followed, as frequently happens by ants. The idea occurred to me that by placing some of the leaves around the trunks and branches of peach trees, I might preserve them from the rays of the sun, which were very powerful. My surprise was great upon the following day to find the trees entirely freed from their enemies; not one remained. These leaves I carefully unrolled, placing upon them fresh ones from the tomato vines, with the result of banishing the last insect and enabling the trees to grow with luxuriance. Wishing to carry still farther my experiment, I steeped in water some fresh leaves of the tomato, and sprinkled with this infusion other plants, roses and oranges. In two days these were also free from the innumerable insects which covered them, and I felt sure that, had I used the same means with my melon patch, I should have met the same result. I therefore deem it a duty I owe to the Society of Horticulture to make known this singular and useful property of tomato leaves.

SLUGS AND FRUIT TREES.

We notice that farmers as a rule seem to care very little for the slugs that defoliate their young pear trees. The leaves disappear so gradually that, knowing that the trees themselves are not immediately harmed, the slugs are not disturbed. But the injury they work is not the less real, though gradual. The functions of a tree cannot be performed without leaves. Its vitality is weakened, and this debilitated condition invites insects and diseases which otherwise would never attack it. The fruiting period of young trees is greatly deferred also by the depredations of slugs, though possibly in older specimens it might be hastened,—especially when the tree is over-vigorous. In young trees the loss of leaves retards the development of fruit spurs,—and the second growth of leaves is generally too late to mature plump and healthy buds. The next spring's growth will be found to be emphatically checked; and, if slugs are then unmolested, the young tree will have experienced so severe an injury that, in spite of the best after-care, it will never again be restored to its wonted

beauty and health. The simplest remedy for the slug we know of, and that most readily administered is,—selecting a quiet morning when the leaves are laden with dew,—to throw up among the branches fine, dry coal ashes. By this method both sides of the leaves will be coated with the ashes and the slugs killed or driven off.

THE MOLE QUESTION.

We are constantly hearing and reading conflicting opinions in reference to the common mole (*Scalops aquaticus*, Cuv.). Opinions and theories are more or less valuable according as they are sustained by facts. These facts must be facts, and not errors made by imperfect observers. No doubt the mole is often confused with other animals which resemble him in many respects. All moles of the same species may not behave alike. One man, perhaps, injures a mole in catching it, for they are very tender, and it dies in six hours, or it eats no vegetable food, and he concludes that all moles would have died soon and refused anything but insects and worms.

I will give a few dates and numbers and details of some recent experiments, and allow each one to draw his own conclusion. Some reason from the construction of the teeth or the food in the stomach. If we were to judge from the teeth alone, we should conclude that dogs and cats were made to live solely on animal food; but we know that cats do eat other things, and dogs often live for months without such food and become very fat.

About July 5, I caught a mole and killed him at once. On dissecting the stomach the next day, the main objects found were half-digested fragments of larvæ of insects, some of worms, beetles, etc. There were some small pieces of straws or stems of grasses, the largest being five-sixteenths of an inch long and one-eighth of an inch broad. The question arose, Perhaps this vegetable matter was in the stomachs of the food eaten by the mole?

On July 13, 1877, about 2 P. M., a large flowerpot was set below the run of a mole, and the pot covered lightly with boards and earth. This was not examined till July 16, at noon. The mole was there in some soil which he had crowded into the pot. He was placed in a nail-keg which was in good condition. The keg was large enough to hold 100 lbs. of nails. One head was out. Two or three inches of sand were placed in the bottom, and a board covered the top quite tight. This was set in the barn at night. Six kernels of sweet corn were dropped in. The corn was old, but had been partially cooked and somewhat softened. On July 17, at 8 A. M., the soil was carefully looked over, and the corn was all gone. Twelve kernels more of corn were put in, and the keg moved near the kitchen door, to be certain that mice did not eat the corn. At noon of the same day eight kernels of corn had disappeared, and before night all were gone. On July 18, at noon, twelve more kernels were thrown in, also a small raw new potato, an inch in diameter, cut through the middle. On the 19th, at 10 A. M., two whole and one-half kernels of corn were found; the potato was untouched. The keg was kept closely covered. Six red pie-cherries were now put in, and at 5 P. M. one piece of the potato was found much gnawed, while the whole of the cherries, except two pits, had disappeared. There was no corn except a part of one kernel. The mole was let out, after

being kept in the keg on the above mentioned food from noon of July 16 till the evening of July 19. He was lively and began to disappear in the ground, when he was killed. No examination was made of his stomach.

PROF. W. J. BEAL.

LANDSCAPE GARDENING.

ORNAMENTATION OF GARDENS.

With regard to ornamentation generally, "carpenter-architecture," besides being expensive, is altogether out of place in small gardens, although harmonious and agreeable in the shapes of summer-houses and rustic seats, where the grounds are extensive. It is common to see a little garden with starveling flower beds and a few shrubs, bestridden by an elaborate, expensive edifice miscalled a summer-house, miscalled an arbor, properly called a nuisance. Another popular delusion that empty urns and vases, painted China sets, ugly statues of mythological deities, are appropriate to square plots of grass and patches of flowers. Suburban gardens are often spotted with these things, which are seldom either ornamental or useful. A rich urn or vase filled with flowers is a beautiful sight, and may sometimes be used with excellent effect, but the right place for it is often an open question. The ornamental properties of decayed tree stumps, and even of half barrels sunk in the ground and covered with strips of bark, are too well known to require particular mention; but a rustic wall pocket against some grand old tree is not so common, and may be made a thing of beauty with trailing vines and bright clusters of bloom. Our motto would be vines everywhere; and a curving-in gate with a light trellis work over it, for graceful climbers, is a most ornamental addition to the entrance grounds. For a purpose like this, the beautiful *Clematis Jackmanii*, is scarcely so well known as it should be; and the fiery autumn blushes of the Virginia creeper, touch up with just the right line of color the *passe* charms of summer verging into fall. But whatever else the owner of a small garden may see fit to do, let him not, as Mr. Wegg would put it, "drop into" statuary. Staring plaster casts, unless veiled and draped with abundant green, are positively hideous; and those who are most given to displaying them in small, unshaded places, would probably return the Venus of Milo, after ordering it, like an Oriental bride, without seeing it, in fuming indignation at a broken and mutilated "nigger," instead of the perfect Greek statue expected and paid for. Mr. Lowell says that "it is only in such a climate" (that of Italy) "that it does not seem inhuman to thrust a naked statue out of doors. Not to speak of the incongruity, how dreary do those white figures look at Fountains Abbey, in that shrewd Yorkshire atmosphere!" Occasionally, perhaps, in extensive grounds, a Naiad by a retired fountain, or a Flora not too elaborately gotten up, may be rather a pleasant object; but, after all, the most harmonious figures where nature is supposed to hold sway, are these of veritable flesh and blood, even if not after the Greek models.—*Appleton's Journal*.

AUTUMN MAKING OF LAWNS.

"Can I gain anything by sowing grass seed, for a lawn, in the Autumn? If so, state the best time." Thus writes a gentleman who feels disappointed because he did not get ready to make a lawn in the spring, and who hardly felt satisfied at the advice we gave, not to attempt to sow grass seed, for a lawn, late in May. Grass seed needs moisture, and will hardly germinate in hot, dry weather, while the weeds will get such a start over the slow-growing grass seed, that even that which germinates will be choked. Our soils are thickly seeded with coarse, hardy weeds, and we must give the grass seed a good chance and a fair start, or they will lose the game. We have known some people get the land designed for a lawn raked off nicely before they obtain grass seed, causing a delay of several days, and during all this time the weeds were getting a good start. One of the quickest and best lawns we have ever known made, was on the estate of Thomas Leighton, of this city. The grass seed was sown about the first of September, and made a good fall growth. A light dressing of well rotted manure was thrown over for a winter protection, and by the middle of the next May the grass was as nearly perfect as could be desired. On account of the occupation of the ground we were unable to sow grass on what we designed for a lawn until November of last year, but thought we would try it. Winter set in very early. The heavy snow of winter and the spring rains made a naturally tenacious soil "too hard for anything," we thought, and we hardly knew whether it was best to plow the whole up and sow again, or wait and run the risk of losing the spring time for sowing. The weather had been exceedingly dry, but just as we were about to break up the hard soil and sow again, a two days' rain gladdened our hearts, the grass started up thick and strong, and our lawn will be pretty good. Still, we would not recommend late sowing. The seed should be sown early enough to make a good growth and become well rooted before heavy frosts. Four bushels of seed to the acre for a heavy, quick sod.—*Vick's Guide*.

ADORNMENT.

"It was one of those pretty houses, surrounded by shrubbery and flowers, about which almost every passer remarked, 'Oh! how I should like to live in that pretty house!'" Such is the description of a house we have in our mind's eye, and it could be true of almost every farm-house in the land, did the occupants only will it so. A few flowers, a little grass, and a few shrubs, all well cared for at a trifling expense of money or labor, and the thing is done. A little care each day would keep everything neat and in order, and a little thought each week would regulate that care to the best advantage. We do not live in this world for ourselves alone; but for the whole world. Upon this principle, we know a woman who always keeps a light in the front rooms of her house every winter night because, as she says, "We not only have the warm glow of it ourselves, but to every passer-by it gives out a cheerful message which produces in his imagination a picture of comfort and happiness within." So it is with the adornments around the house. They not only give enjoyment to their possessors, but to everyone who passes they send a message of thrift, refinement,

and happiness, which should alone be sufficient compensation for the little labor and expense they may cost.

We remember once passing through a little village in which almost every house was surrounded with flowers, shrubs, and vines, and which left upon our mind an ineffaceable impression. Though nearly twenty years have passed since then, we still think of it frequently with pleasure. Could the occupants of those pretty village places only know of this, they would doubtless feel amply repaid for all their trouble. In all your calculations on the profits of your crops, by all means fail not to include your crop of household adornments. The profits on your grain *may* be lasting, probably will not; but the profits on your pure, God-given pleasures, though not counted in dollars and cents, can never vanish.—*Rural New Yorker*.

ARBORICULTURE.

OUR FORESTS REQUIRE PROTECTION.

On reading the first article in the August Popular Science Monthly, I feel more deeply impressed than ever with the importance of the preservation of our forests. It is strange indeed that the world should be so slow in learning the desolating effects of stripping a country of its forests. I have no doubt that already Michigan feels its effect, though so much remains, in occasioning the summer drouths that certainly are more frequent than formerly. My recommendation would be to leave at least one-fourth of the country in native forest, besides extensive planting of fruit and ornamental trees; and for the purpose of ornament, plant or leave clumps and thickets more frequently than is generally seen in this country. In Europe that is done much more than here. And why planting single is so much practiced here, I cannot explain, unless it be our high estimation of personal individuality. And yet we put them in formal rows instead of imitating nature's more beautiful ways of adjustment. It is probably a mistake to suppose our adjacent lakes protect us from drouths, for from the coolness of their waters they more often take than give the rain. And if we go on denuding this Lower Peninsula as we have its southern part the past fifty years, let me predict that in fifty years more the diminution of the rain-fall will be very great.

My old school fellow, the Hon. George P. Marsh, in his book "Man and Nature," says much on the subject, speaking from personal observation, for he had traveled much in Western Asia, and has resided in those parts more than twenty years, and is now minister in Italy. And if Dr. Oswald, in his communication referred to, does not exaggerate his account of the dreadful effects of the destruction of the forests on the eastern continent should prove a warning to us of the western that cannot be too soon heeded. He shows that vast countries, once rich and with their millions of inhabitants, are now deserts or but thinly peopled.

I am now farming some lands that would not stay sold, and am much an-

noyed that the purchasers so cut off the timber in places where they should not.

You will see that there is too much of the egotistic in this for publication; but I could not forego the impulse, to urge you often to say a word on this vital subject. It grieves me to see also the present waste as well as the certain future damage to our fair State; not only cutting off our splendid pine at little profit, and faster than needed, but the hard timber too. I have seen in this country miles of black walnut rail fences, and that and cherry in log heaps. Thus now, as in ages past, there seems a strong infatuation on this subject, and oh! may it be stayed.

JOHN BALL.

Grand Rapids, July 2, 1877.

SANITARY USE OF TREES.

A correspondent of the American Architect calls attention to a phenomenon which he has observed in the outflow of waste from his own house. He has a close-built brick cesspool 8 feet in diameter and 8 feet deep, with an overflow thence for liquids into a percolating stone cesspool 10 feet by 10 feet; both are domed over at the top, closed each with a flat stone, and covered with soil. Unlike his neighbors, whose cesspools are constructed in the same manner and in the same kind of soil, but who are subjected to the necessity of cleaning out both cesspools at frequent intervals, his own have been in use for four years without being opened, and have given him no inconvenience. A few months ago a deep excavation in the street near his percolating or overflow cesspool revealed the fact that the moisture from it was all absorbed by the roots of three large and very flourishing trees, a tulip and two maples, in its immediate neighborhood. "There could be no accumulation of water," he says, "where there were such channels to draw it up." This certainly is an important point to be considered in locating the area of absorption for household waste. We do not remember to have seen elsewhere noticed this very probable sanitary function of trees; but if the theory is correct, it goes far to solve the most serious difficulty in the problem of drainage without common sewers.

RESOLUTIONS ADOPTED BY NATIONAL NURSERYMEN'S ASSOCIATION.

Whereas, In view of the great importance of the future fruit interest of America, and in consideration of the lamentable ignorance relating to an enlightened system of forestry, and of the great variety of information to be gathered by a proper investigation and report of the forests of Europe, therefore,

Resolved, That, in the opinion of this society, it would be eminently proper for our government to take speedy action in the matter, and send a commission for the purpose of presenting to our countrymen the status of European forestry, and give, in a suitable report, the results of the centuries of practice in this important branch of agriculture, and the data furnished by the best scientists of those countries, in connection with the influence of forests upon the climatic conditions of the land.

Resolved, That a committee of five be appointed to prepare and present to Congress a memorial on the importance of early action in the appointment of a commission to visit the various countries of Europe, to make a thorough examination of the forestry system of those countries, and at as early a date as possible, make a full report of the same.

ORNAMENTATION OF FARMS.

The following remarks relative to a subject very interesting to owners of farms or tracts of land in or near to towns or villages, were made at the meeting of the New Jersey Horticultural Society, by E. S. Carman, of River Edge, Bergen county, N. J. After impressing upon his audience the necessity of closely adhering to nature in their efforts to copy her, he said :

“Our first motive in embellishing our grounds is to render them as attractive as possible, that they may become the dearest spots on earth to us. To this end, if we are to have but fifty trees and shrubs, let every one be different, and as different as possible. Let us have no pairs or triplets, or quadruplicates of anything—as if every tree needed a sentinel, or as if it were afraid to stand alone, or as if two or more individuals were needed for the completion of one another. Here to the right we have a maple. There to the left, situated relatively to other objects precisely the same, another maple—each the ghost of the other. Both are thrifty, shapely, fine. They are so nearly alike we can detect no difference. Nothing is to be learned—no impression formed from looking upon both that is not as well formed from looking upon one. Why then have both? Why not have in the place of one of them another species or genus that creates a new impression and gives additional food for pleasurable study? And yet these monkey grounds, as we may call them, are the rule whithersoever we go. A mile or so from my own residence is a lawn planted with arbor-vitæ—in rows as we would plant an orchard—and with little else but arbor-vitæ. They are, perhaps, fifteen feet in height, and all of the same stiff, conical, monumental form. I never pass this place without being reminded of a burial ground with evergreen tombstones!

“We are instructed by the books at first alluded to that ‘there is something displeasing’ in the introduction of fruit trees among elegant ornamental trees on a lawn—one class of vegetation suggesting the useful and homely alone to the mind, and the other avowedly only the ornamental. That apple or pear trees, so mingled, do produce an displeasing impression upon the mind is, in the main, true enough. But does not the fault lie rather in the mind than in the apple and pear trees? If there is a tree that combines the beautiful of all trees—picturesqueness, flowing lines, symmetry—it is the apple when given the same care that our favorite ornamental trees receive. And little less need be said of the pear. I once saw—25 yards off in a garden—a tree so compact, so shapely, that I hastened nearer to ascertain what it was. The impression of its exceeding beauty remained unchanged until I discovered that was a Seckel pear tree. Then it lost a part of its ‘exceeding beauty.’ I would use fruit trees as any other in ornamental grounds—but it is a mean taste that excludes them, because they are useful as well as ornamental.”

AN EVERGREEN PLANTATION.

There are many who have small bits of ground near their houses or buildings, which may be made useful screens, or wind breaks, or even ornamental plantations, and to whom the following article, written by a correspondent of the *Gardener's Monthly*, will afford some useful hints even if it comes from so far south as Pennsylvania. The writer says:

I have a narrow, good-for-nothing strip of ground, about ten rods from my house, its nearest boundary being a small winding stream, while the other side reaches to a dividing fence. It is so rocky that it is almost useless for tillage, and I concluded that the best use I could make of it was to plant it with evergreens. It was thinly covered with small chestnuts, oaks, maples, etc., and any that were likely to injure the future occupants of the ground by falling on them, were cut down; the brush was gathered and burned, and without further preparation my site was ready for planting. I had a quantity of shrubs and trees on hand, consequently there was little selection of kinds to be made.

The front of the strip, next the stream and the house, was set with American arbor-vita, varied occasionally with hemlock spruce (which by the way, is one of the finest, hardy evergreens grown, when properly treated), and American rose bay (*Rhododendron maximum*), while at suitable places, at the extreme margin, a few plants of the dwarf yew, or ground hemlock (*Taxus Canadensis*), were placed.

The background was filled mainly with Norway spruce, sparingly interspersed with beech, to be still further relieved by a few white stemmed birch and a specimen or two of the purple-leaved beech. The arbor-vitæ were set about eight feet apart, and the larger-growing trees at proportionate distances, not in straight rows like an orchard, but imitating the irregularity of nature. The planting was quickly done in this way:

Small holes were dug with a mattock, and the trees (already trimmed, and which had been several times transplanted) were taken up, with nearly all their roots and a mass of soil adhering to them, and placed in the holes; the loose surface soil was drawn about the roots and well worked in with a sharp pointed stick. As soon as the roots were thus covered, the soil was well stamped down all around, as firmly as possible by the feet; more soil was drawn in, stamped again, the tree straightened up, the surface finally filled in and covered with a good coat of leaves and brush. No water was used, and, although some of the trees were four or five feet high, I would not give any one four cents to warrant the whole lot to grow. My little plantation, or copse, is already quite a noticeable feature in our landscape, and will become more so every year; its never-failing green forming a point that the eye is glad to rest upon.

IN AND ABOUT THE HOUSE.

HOW TO TREAT TENDER PLANTS THAT HAVE BECOME FROZEN.

The disastrous effects which tender plants, which have become frozen, are subject to, is generally known to cultivators; but how or why freezing produces the effect it does upon plant life, is not so easily ascertained, and all attempts heretofore made by scientific men to solve the question, have been, at most, only partially successful. In practical experience it is found that the length of time, and the degree of cold to which plants are exposed, affect them in proportion to the duration and intensity of these conditions, which points therefore, to the speedy restoration of a suitable temperature, as the best means of restoring plants that have been unfortunately exposed to frosts. But the thawing out should in all cases be moderately gradual, and one of the best things to do when plants have become frozen, either in the dwelling, conservatory, or open air, is to sprinkle the foliage with cold cistern or well water, as the temperature turns to rise. In the dwelling or conservatory, however, it will be necessary to start the fire in the stove, furnace or flue, the first thing of all to give temperature an ascendancy, but it should for several hours not be allowed to rise above an ordinary suitable degree. Some advocate shading the plants from the sun and light for some length of time, but the policy of so doing has never been apparent to me, while I have frequently had proofs to the contrary; and the sun's rays striking upon the plants with gradually increasing heat, in a great measure aids in their recovery. There is a great difference in plants as regards their ability to resist cold, and while some the slightest frost will injure beyond cure, others will bear various degrees, and even alternate freezing and thawing again and again, with impunity. Avoid handling plants in a frozen condition as much as possible, as the injury to them will be heightened should the leaves become bent or be roughly brushed over. To restore flowers that have become frozen, place them in cold water until they have thawed out.

LEAVES FOR GARNISHING FRUIT.

Some kinds of leaves are more suitable than others for this purpose. Strawberries for instance, look best associated with their own foliage; grapes may be laid on their own leaves, but there are others which suit them quite as well. One of the best plants for furnishing leaves for garnishing all kinds of fruit is the curled mallow, an annual of which I make three sowings in a year in rich soil—the first early in April, the second about the beginning of May, and the third about the same time in June. The leaves are about the size of small vine leaves, and beautifully frilled. Wherever fruit has to be garnished, this plant should always be grown. The ice-plant also furnishes good leaves for summer garnishing, its glistening, icy appearance having a cool and pretty effect on the table. It should be sown in a pan or box, in heat, in the first or second week in April, and planted out in the open border in May. These are the only plants

which I grow for garnishing fruit in summer and autumn. In winter and until this time variegated kale and bay leaves answer the purpose. Bay leaves are rather stiff for grapes, but for oranges, apples, and other fruit, they may always be used with good effect.

AMERICAN BULBS.

Talk about the beauty and the comparative cheapness of Dutch bulbs! Why, I know a tale worth two of that. Last year after the tops had died away from our wild flowers, I obtained some roots of the anemones, blood-root, liver-root, marsh marigold, and numerous other species, which were carefully potted and placed away in a cool shady spot for the winter. They are all just beginning to show their pretty flowers, and promise to be as bright and cheering as any of the imported bulbs, with far less expense. The idea of removing these plants at once to the open flower garden is preposterous, but by treating them as above, and using light peaty soil, or leaf-mold, success will be attained. I intend my experiments this season to embrace the greater portion of our native plants that are really worth growing. C.

PARLOR AND WINDOW PLANTS.

A New York florist gives the following as an indicative list, which will be found of value to any one attempting parlor and winter gardening: To flourish in the shade,—*Dracenas* (dragon tree), *Mimulus* (musk plant), *Achyranthos*, *Coleus* in many varieties, *Centaureas* (dusty miller), fuchsias, pansies, zonale geraniums, ivies (English and German), begonias, ferns and fancy caladiums, petunias, ivy-leaved geraniums, gazanias, heliotropes, verbenas, monthly roses, mignonette, cypress and Madeira vines, dwarf cannas, calceolarias, lantanas, lobelias, nerembergia, cuphea and tropeolum; for both sun and shade: centau-reas, ivies, maurandia, thunbergia, tropeolum. Of these there are many varieties in each separate class, so that the foregoing lists, short as they seem, will in reality be found comprehensive enough to meet all reasonable requirements for indoor floriculture.

WINTER WINDOW GARDENS.

A lady writes the Germantown Telegraph: In city or country some one sunny window in every house may be "a thing of beauty and a joy forever," with more or less outlay of money and labor, as the person may feel disposed. A bay window is of course better adapted for plants than a single one, but either should first be provided with a plain deal box the length of the window, from two to four feet wide, and at least six inches deep. Have holes bored in the bottom, and place upon it an inch of broken pottery, charcoal and pebbles, to insure drainage. Fill with rich, friable soil, and in it plunge the pots of geraniums, fuchsias, heliotrope, etc.; then plant tradescantia, coliseum ivy, se-

dums, etc., along the edge, and soon the whole surface will become a mass of various shades of green, intermixed with the bronzy purple of *tradescantia zebrina*, and the golden flowers of the musk plant, or exquisite lavender of the delicate-leaved ivy; while if a German or English ivy has been placed in each corner, the long festoons will soon hang to the floor and the tendrils go clambering up the window frame, and reach out arms that appear to be pleading for some support.

From the upper part of the window frame may depend various baskets and "hanging vases" or "amples," filled to overflowing with the bright-leaved "foliage plants," for centerpieces; and trailing over the sides, *Madeira* vines, *ipomea*, ivy-leaved geraniums, yellow gazanias, *mesembryanthemum*, the partridge vine, dew plant, and *tetrinoides*. A bay window may be beautifully arranged as a grotto, with a deep, rough box filled with earth and rocks, piled up and grouped in picturesque confusion, with ferns, vines, mosses, etc., planted in the recesses, and hanging in long, graceful festoons from the rocky projections. Trellises of cedar, with the bark remaining, are suitable for such a window; and tubs planted with ivy, *Ampelopsis veitchii*, *Cobaea scandens*, climbing roses, or other climbers, placed on each side of the window and trained in an arch over the window, form a beautiful frame for such a sylvan picture, and are easily cared for.

Rustic baskets of wire, filled with moss and suspended by grape-vine branches with delicate vines twined around them or covered with moss, are beautiful, hung from the ceiling of the window, or from hooks or moss-covered brackets. The entire ceiling may soon be made a bower of greenness by fastening long vine branches or wire in arches from side to side, and planting *Madeira* vine or German ivy in boxes covered with bark moss, lichens, oak leaves, and acorns placed on the sides of the windows. Suitable hanging baskets for such a "woodland window" might be made of cocoa-nut shells, wooden bowls covered with pine cones or gnarled twigs and roots, or log-cabin boxes, made by placing mossy sticks, one crossing the other, until of desired height, then fastening with nails to a square board with holes in each corner for cords, and filled in with moss (between the "logs").

MISTAKES IN SELECTION.

Do not insist upon your *coleus* and geraniums thriving in the shade, nor your ferns in the full sun. In window gardening many mistakes are made by injudicious selection. Admiration of the grace of some species of fern, or the beauty of some lovely tropical stove-plant, is no good reason for attempting to grow them in the dry heat of our living rooms. We must select such as are not over-nice about their surroundings, and that will bear the most neglect, although the latter by rights, should not be admitted into the list of requisites. There are some plants, as for example the *camellia*, *azalia*, Chinese primrose, and pansies, which really prefer a cool temperature, combined of course with moisture. Others again will not thrive without heat, such as the *heliotrope*, geranium, and *bouvardia*. A third class, and one that has been too much neglected, is the succulents, which like to be let alone; desiring neither water, extreme heat, or a very low temperature. Many of them, such as the various cactuses, bloom beautifully; all are more or less grotesque and interesting, and

with rarely an exception, require no care during Winter. The use of vines for hanging baskets in our rooms has become universal; but they may also be made to answer a still more ornamental purpose by training them around the window casements, wherever they may obtain sufficient light to enable them to live and flourish.

WARDIAN FERNERIES.

The New York Herald tells how to construct an inexpensive Wardian case. The frame may be made of wood, which is least affected by sudden changes of temperature, or of galvanized iron, which is less liable to decay. Let the width of the case be nearly one-half the length. The height of the glass sides should be the same as the width, and the roof formed of four sloping sides with a flat top, one side of which should be fixed on hinges, in order to give ventilation. By making the frame-work of wood, any boy of fourteen with ordinary ingenuity can make a case of this kind. The sloping roof is not only more graceful than the flat top, but also gives room for the growth of taller plants. The pan to receive the ferns, must be of zinc or galvanized iron. It is not necessary to have a double bottom. Bits of charcoal and broken potsherds will give the proper drainage. Lay these in the bottom, to the depth of an inch, and cover with eight inches of soil. The water will drain into these bits of charcoal and potsherd, and may be drawn off by a stop cock in the bottom. The soil should be of peat, silver sand, and leaf mould, in equal parts, well mixed by hand, but not sifted. Now having prepared the soil, select your plants, remembering to grow together only such as require the same amount of light and moisture.

For a case of medium size and ordinary workmanship, the pretty ferns, mosses, and early spring flowers, from our own woods will answer admirably. Take them up carefully, keeping as much earth around the roots as possible, but shaking off all sods which contain roots of grass that might grow so rapidly as to hide your ferns. You will find in any wood many varieties of ferns, among them the curious walking leaf, and in the earth, clinging to the roots of the ferns will be seeds and roots of wild flowers, which will grow and bloom in your case. It will be a constant source of happy surprise to watch the starting of new plants and the unrolling of each tiny frond of the ferns. Many meadow and swamp plants will also thrive well. Having chosen your ferns, cut off all damaged or dead fronds, taking care not to injure the young shoots. Place them firmly in the soil, but do not crowd them too closely. As soon as planted give a slight watering, to settle the soil. Shade the case for a few days until the plants become established; leaving it open for a couple of hours each day will give sufficient ventilation. Keep the soil moist but never allow it to become soaked and sodden. Too much moisture will cause the old fronds to collect mould, and the younger ones to decay. Light is, of course, essential, and a little gentle sun-light is beneficial; but the case should never be exposed to the direct rays of a hot sun. Keep the case closed when the sun is on it. When the soil becomes too wet and moisture collects on the glass, give ventilation. Many flowering plants which will not otherwise succeed in our parlors, bloom profusely in a case. They should be grown separately from the ferns, however, as they require more ventilation. Gloxinias, pansies, and begonias

thrive well in a case, as also do many orchids; but in general the case is more adapted to the preservation of flowering plants than for their growth.

SCIENTIFIC HORTICULTURAL NOTES.

SEEDS THAT BORE.

Some time since, in a paper by Mr. Francis Darwin, read before the London Linnaeus Society, the curious structure of the seeds of some of the grasses was shown, by which they were enabled to pierce their way into the ground. In relation to this subject, in a recent number of *Nature*, Mr. Darwin calls attention to the discovery by Herr Fritz Muller of more than a dozen grasses and one species of geranium, growing in Brazil, whose seeds possess these peculiarities. They are furnished with awns, which, twisting by the action upon their cells of an alternate moist and dry atmosphere, when lying upon the ground, this hygroscopic torsion causes the seeds to penetrate into the soil. In one of the most singular specimens, belonging to the genus *Aristida*, the seeds have three-tailed awns, five or six inches long, which, projecting in three directions more or less at right angles with the seed, serve to hold it in an upright position, with its lower end resting on the ground in the most favorable manner for boring into the earth.

FEEDING PLANTS.

A great deal is written and said about methods of feeding cattle to produce the most flesh, and the kinds of food to employ to get the best results, but few stop to think that the same kind of discussion applies to plants. Food that will cause some plants to thrive is about the same as poison to others, so that plants may be said to have a diversity of tastes.

We are apt to think of all manures made on the farm as alike, except as we distinguish by speaking of one kind as made from horses, another from cattle, etc., etc. But plants that appropriate this manure for food indicate plainly a different classification. If the same food is given the hog as the horse, in the same quantity, the manure produced will be exactly the same, provided no flesh or milk is made from it, and the differences in manure are not made by the animal, but, rather, by the quality of food eaten. Plants find this out very readily, and by their laboratories decide oftentimes that the manure produced by a herd of cattle fed upon straw, with a very little grain, is very inferior to that made by another herd fed upon the best quality of hay, with an abundance of grain.

Plants, again, in their choice of food, very often outwit the best calculations of the keenest chemist. It has been found that it is not safe to assume that

any chemical formula will make a definite amount of organized vegetable substance, because the economy of the plant may not be in exact accordance with the chemist's notions. It is not so different from animal life. We may learn, ourselves, from the result of laboratory investigation what we ought to eat to thrive, but we exercise some choice in the matter and do thrive on something quite different, that is more in accordance with our taste. Circumstances and conditions vary so much that it is unsafe to predict what manures to employ for any class of plants. This has been exhibited time and again in the application of mineral fertilizers. There is a wholesale disagreement in the results of their use, because under the varying conditions the plants do not choose to do as desired.

The food of plants, whether we give it in the form of guano, ashes, compost, or muck, depends upon the amount of soluble nutrition they can get out of it; hence, it is desirable that in whatever form we apply our manure, if we wish quick results we must make it as soluble as possible.

The writer of this has produced the best results in the feeding of plants by the use of composted muck and barnyard manure well rotted, and it is made in this wise: A layer of muck is put as a foundation of the compost heap, and upon this a layer of barnyard manure; upon this another layer of muck, and so on, alternating muck and manure, until the heap is four or five feet high. The manure is used in about the proportion of one to three of the muck. The whole pile gradually heats and rots together, so that without further stirring over, if the heap is made in early autumn, it will be in the best of shape to use the following spring.

S. Q. LENT.

LEAVES AND TREES.

It might appear not unadvisable that every leaf should, as it grew, pay a small tax to the stalk for its sustenance, so that there might be no fear of any number of leaves being too oppressive to their bearer; which, accordingly, is just what the leaves do. Each, from the moment of its complete majority, pays a stated tax to the stalk, that is to say, collects for it a certain amount of wood, or materials for wood, and sends this wood, or what ultimately becomes wood, down the stalk, to add to its thickness. As the leaves, if they did not thus contribute to their own support, would soon be too heavy for the spray; so if the spray, with its family of leaves, contributed nothing to the thickness of the branch, the leaf families would soon break down under their sustaining loads. Each leaf adds to the thickness of the shoot, branch, and stem, with so perfect an order and regularity of duty, that from every leaf in all the countless crowd at the tree's summit one slender fibre, or at least a fibre's thickness of wood, descends through shoot, through spray, through branch, through stem; and having thus added in its due proportion to form the strength of the tree, labors yet farther and more painfully to provide for its security; and thrusting forward into the root, loses nothing of its mighty energy until, mining through the darkness, it has taken hold in cleft of rock or depth of earth as extended as the sweep of its green crest in the free air. * * * If ever in Autumn a pensiveness fall on us as the leaves drift by in their fading, may we not wisely look up in hope their mighty monuments? Behold how fair, how far prolonged in arch and isle, the avenues of the valleys, the fringes of the hills! so stately,

so eternal, the joy of man, the comfort of all living creatures, the glory of the earth—they are but the monuments of those poor leaves that flit faintly past us as they do. Let them not pass without our understanding their last counsel and example—that we also, careless of monument by the grave, may build it in the world—monument by which men may be taught to remember not where we died, but where we lived.—*Ruskin*.

INFLUENCE OF STOCK ON GRAFT.

A curious and very conclusive instance, showing the effect of the graft upon the stock, occurred in one of my greenhouses the present season. Last December, my gardener selected a stock of *Abutilon Boule de Neige*, a well known variety with white flowers and green leaves which have never shown any signs of variegation, and after trimming off the side branches, inserted a graft at the height of four feet, of *Abutilon Mesopotamicum variegatum*. This latter variety is of trailing or weeping habit, and has its foliage intensely variegated with different shades of mottled green and yellow. The graft grew, and retains all its peculiarities of growth and variegation; the stock has also put forth new side shoots all along its length of four feet below the graft, and nearly all the leaves on these shoots growing from the *Boule de Neige*, are marked with clear and distinct variegations of golden yellow, which can only be attributed to the influence of the graft above.

Upon the other side of the question, I will also give an instance of my experience. Two roses were growing near each other; one a variety with very dark crimson, but not well-formed flowers. The other a light blush rose, finely formed, but of a light and undecided color. From the latter variety I inserted buds into the growing shoots of the first named, with this result: The buds grew and retained all their habits of growth and foliage as well as the form of the flowers; but the color, instead of the light and uncertain blush, was of a rich, dark crimson; nearly, but not quite as dark as the bloom of the stock upon which it was budded.

GEO. W. CAMPBELL.

PEAR TREES CHANGING THEIR FRUIT.

The Scientific American relates the following experience for the study of pear culturists:

A curious instance of natural mingling of varieties recently came under our notice, which offers a valuable hint to fruit growers. In an enclosure some 50 feet wide by 150 feet long was set out, about nine years ago, a number of pear trees. Several varieties were included, notably the Bartlett, Sheldon, Flemish Beauty, and other fine varieties, together with three or four trees which bore coarse, late-ripening, winter pears, scarcely fit for anything but cooking purposes. All the trees bore abundantly; and until the last two years the pears of each variety showed no change. Recently, however, and in a more marked degree during last summer than during 1875, it was found that all the fine

pears were slowly becoming of a single hybrid species, or rather series of modifications, of the winter pears. The Bartletts especially are showing the characteristics of the winter pears in a remarkable manner, and the "puckery" taste of the latter is especially observable. It is curious that the active part is taken by the winter pears in influencing the others, while they themselves, as yet, show no modification. The question is, how could the winter pear exert this predominating influence, not only over the trees in its immediate neighborhood, but over others at the opposite end of the enclosure? It is of course, probable that while the trees were in blossom, the pollen of the winter pear flowers was transported to the flowers of the other trees. The phenomenon is in any event doubly suggestive; first, in that it is an instance of a new variety being gradually formed by the action of nature; and second, in that it indicates to fruit growers the danger in placing fine pear trees in proximity to those of inferior variety.

NATURAL ROTATION OF PLANTS.

In relation to the natural rotation of plants, M. Dureau de la Malle in 1825 called attention to this natural phenomenon. He found that in pastures the grasses get the upper hand for a time, then the leguminous plants, so that in thirty years the author was witness to five or six such alterations. Dean Herbert has called attention to the fact that a plant does not necessarily grow in the situation best adapted to it, but where it can best hold its own against hostile neighbors, and best sustain itself against unfavorable conditions generally.

Investigations have made it apparent that forests also have their natural rotation; deciduous trees succeed coniferous ones, hard woods soft woods, etc. But it is not as stated by Dean Herbert. Certain trees and plants do occupy certain soils and situations, and to the exclusion of others; and, as a rule, those soils and situations best adapted to them. It would have been better stated to have said that trees and plants do not always occupy those situations best adapted to them.

NATURAL DISPERSION OF PLANTS.

Statistics relating to the distribution of the flora of Europe, reach a curious conclusion, and which will apply without doubt to other countries. It is, that those plants having seeds or fruit with special appendages to aid in their dispersion are generally less widely scattered than those destitute of such helps. The single exception is in the cases of seeds provided with a tuft of hair,—technically termed coma,—which have a very broad range. The seeds of the willows and those of the milk weeds are furnished with the coma. Dr. Gray states that these last plants, which are "the most comose-seeded of the higher orders," have not a wide range in North America. It is also found, from a study of the European flora, that plants whose flowers bear but a single seed, are more broadly distributed than those bearing two or more seeds in each cell. Plants with albuminous seeds somewhat surpass in range the ex-albuminous,—a singular fact, considering the ex-albuminous seeds have the longest known

vitality, and best bear exposure to sea water. Large genera have a slightly greater dispersion than small ones, and variable species than those not especially so.

WHITE-LEAVED PLANTS.

It is well known that plants of various kinds, through disease or other causes which sometimes become hereditary, throw out white leaves and, indeed, whole branches. When this extends to the whole plant, however, it immediately dies. Mr. Peter Henderson, in the *American Agriculturist*, relates the following in this connection of a geranium:

"A few days ago, being in the greenhouse of one of our well-known florists, he showed me, growing among a mass of 'Smilax' foliage (*Myrsiphyllum*), a strong, vigorous shoot of a geranium with stem and leaves as white as snow. I was perfectly nonplussed for a few moments, as on examining the root there was apparently no shoot except the white one, but on scraping the soil off for a couple of inches, I found the waggish owner had trained a strong shoot nearly six feet high behind the screen of smilax, which at once accounted for the healthy condition of the white shoot. The plan was ingenious, and was done in such a way that, had the florist been dishonestly disposed, he might readily have found a purchaser, as his white branch had nearly all the vigor of the green shoot. If we once detach the white shoot from the life-sustaining green portion, death to the white is only a question of time,—and very short time, too.

ON THE DIURNAL OPENING OF FLOWERS.

Mr. Thomas Meehan, at a recent meeting of the Academy of Natural Sciences, Philadelphia, offered some interesting remarks on this subject. Some plants have been regarded as floral barometers, for it would seem that some plants opened their flowers at particular hours of the day, and meteorological conditions do not appear to influence the time of opening. The *Portulacca oleracea*, common purslane, opened about eight, and by nine had performed all its functions; while a closely allied plant, *Talinum Teretifolium*, opened at one P. M. and was closed by three. In grasses, Cyperaceæ, and some rushes, the floral parts were very exact in their time of opening. In the plantains (*Plantago*) the pistils appeared a day or more in advance of the stamens, and these last appeared at about a regular time in each day. In *Luzula campestris*, the wood forms, he had by a series of observations timed it exactly. Before nine the anthers were perfect, but by ten had all been committed to the winds, and only dried membranous matter remained.

Mr. Meehan says the popular impression of light and moisture as agents in their behaviour had seemed to receive a tacit scientific assent. It was clear, he thought, there was a more powerful agency underlying them, and it was perhaps a gain to science to be able to see this, though in so dim a light.

DARWIN'S NEW BOOK.*

BY PROF. W. J. BEAL.

It seems to be the general opinion of all who are prepared and competent to judge, that Mr. Darwin has produced a most wonderful book,—as I believe, one which has not been excelled in importance to the farmer by any work in this or in any age.

It is not easy reading, even to the botanist who is most familiar with the subjects treated. The author has recorded in a book of about 500 pages, a vast number of experiments and observations made, and in many cases often repeated, during a period of ten or twelve years. He has crossed the flowers, sowed the seeds and measured the heights of the plants, weighed or counted the seeds and capsules, often two or three times for many years, of several specimens of plants belonging to fifty-seven species, of fifty-two different genera of thirty families. These are natives of very different parts of the world. He has made a book choke-full of information, valuable to the gardener and farmer, yet, in the words of the *Gardener's Chronicle*, "It is certain that these practical results will be a long time filtering into the minds of those who will eventually profit most by them." If the results are so valuable, and if much time must be occupied in reaching the understanding of farmers, this slow process cannot begin too soon, nor can its advantages be kept too persistently before their minds.

"There is weighty and abundant evidence that the flowers of most kinds of plants are constructed so as to be occasionally or habitually cross-fertilized by pollen from another flower, produced either by the same plant, or generally, as we shall hereafter see reason to believe, by a distinct plant. Cross-fertilization is sometimes ensured by the sexes being separated, and in a large number of cases by the pollen and stigma of the same flower being matured at different times. It is also ensured, in many cases, by mechanical contrivances of wonderful beauty, preventing the impregnation of the flowers by their own pollen. Again, there is a class, in which the ovules absolutely refuse to be fertilized by pollen from the same plant, but can be fertilized by pollen from any other individual of the same species. There are also very many species which are partially sterile with their own pollen. Lastly, there is a large class in which the flowers present no apparent obstacle of any kind to self fertilization; nevertheless these plants are frequently intercrossed, owing to the prepotency of pollen from another individual or variety over the plant's own pollen."

There are, however, some cases which seem especially contrived for self-fertilization. The number is much smaller than would be supposed by a hasty observation.

Andrew Knight, more than seventy-five years ago, said that "Nature intended that a sexual intercourse should take place between neighboring plants of the same species." Mr. Knight, and many since his time, practiced cross-breeding plants quite extensively, for the purpose of obtaining new and improved varieties. At present, there are many experts in this art in Europe and in this country.

By cross-fertilization is meant "a cross between distinct plants which were raised from seeds and not from cuttings or buds." In the proper sense, then,

* The Effects of Cross and Self-fertilization of Plants, by Charles Darwin.

we could not cross a flower of one Northern Spy apple-tree with the flower of another tree of the same variety, as they have all come from the grafts or buds of one seed. In like manner it would not be a cross to fertilize a flower of the General Grant geranium with others of the same variety, because all our plants have come from cuttings of one parent plant, or some of its descendants.

Many of Mr. Darwin's plants were raised from seeds which were sown at the same time, near each other. The best young plants from the seeds of crossed flowers, and the best which came from self-fertilized flowers, were planted on opposite sides of the same pot, where the soil was well mixed. "In comparing the two sets, the eye alone was never trusted."

Fifteen plants of Indian corn from crossed seed exceeded in height fifteen others from self-fertilized seed, as 100 exceeds 84. He experimented with plants of the common Morning Glory for ten generations, using the same number of plants from crossed plants as from those self-fertilized. The average in height for the ten years is as 100 to 77 in favor of the crossing.

The flowers of this plant are freely crossed if left to themselves, exposed to insects. It is, then, altogether likely that the seeds with which Mr. Darwin began were from crossed flowers, yet, in the first generation, the seeds of crossed plants exceeded those self-fertilized as 100 exceeds 76. If we compare the number of seeds and capsules produced in the first generation, the crossed plants exceeded the others as 100 exceeds 64. The relative superiority of the crossed plants is chiefly due to their producing a much greater number of capsules, and not to each capsule containing a larger average number of seeds. When self-fertilized for nine generations, the flowers were of a uniform tint, as those of a wild species, while those in the beginning were of various colors. The crosses, so far mentioned of the flowers of Morning Glory, refer to crosses of different plants raised in the same garden, year after year. After nine generations he introduced seeds raised at a distance, under different circumstances. Plants from these were crossed with plants which had been intercrossed in his garden. This cross (called the Cochester-crossed) exceeded in height the other intercrossed plants of the tenth generation, as 100 exceeds 78. In number of capsules, they were to each other as 100 to 57, and the capsules, in weight, as 100 to 51, in favor of those crossed with foreign stock.

Here we get a most important fact, not learned by Mr. Knight, or any one else, that a cross from a fresh stock increases the size of plant and its fruitfulness, probably owing to their differing somewhat in constitution or character. *The crossing of closely related plants is generally an improvement over self-fertilization; but crossing with foreign stock of the same variety is a far greater improvement.*

The proof of the truth of the above sentence in italics is worth untold sums to the raiser of vegetables, the florist, the pomologist, to the general farmer.

In the sixth generation of the self-fertilized morning glory, appeared a single plant which conquered its crossed opponent by half an inch in height. Its descendants continued vigorous and fertile, even when self-fertilized. They were not profited by a cross with a distinct stock. Mr. Darwin adds that if this latter part is trustworthy, it is a unique case, as far as he has observed in all his experiments.

FOREIGN-CROSSED STOCK AHEAD.

In the case of *Mimulus luteus* (monkey-flower), a small herbaceous ornamental plant, Mr. Darwin found for three successive generations that the crossed plants

exceeded in height those which were self-fertilized, but in the fourth generation one of the self-fertilized plants beat its crossed opponent. "This victorious self-fertilized plant consisted of a new white-flowered variety, which grew taller than the old yellowish varieties. From the first it seemed to be rather more fertile, when self-fertilized, than the old varieties, and in the succeeding self-fertilized generations became more and more self-fertile. In the sixth generation the self-fertilized plants of this variety, compared with the crossed plants, produced capsules in the proportion of 147 to 100, both lots being allowed to fertilize themselves spontaneously." This instance appears analogous to the vigorous self-fertilized morning-glory which appeared on the sixth generation. In the eighth self-fertilized generation some flowers of *Mimulus* were self-fertilized; other flowers were crossed with those from distinct plants of the same lot, and "others were crossed with a new stock of plants from Chelsea. The Chelsea crossed seedlings were to the intercrossed in height as 100 to 56, and in fertility as 100 to 4; and they were to the self-fertilized plants in height as 100 to 52, and in fertility as 100 to 3. These Chelsea-crossed were also much more hardy than the plants of the other two lots." This remarkable result brings out with great force the idea italicised above, that crossing a variety or species with a foreign stock, often produces

RESULTS WONDERFULLY FAVORABLE.

This is the great leading point conclusively proved by experiments cited all through the book. It towers above all others in such a way that it cannot be easily overlooked. There is need of many other experiments in the same direction in different portions of our country, and especially are experiments needed in crossing with foreign stock all of our garden vegetables which store up nourishment in roots, as beets, turnips, salsify, carrots, parsnips, radishes, and the like. Here is a new field not yet worked, and one well worth a good trial. In case of trees and shrubs, and other plants too, it is an easy matter to have pollen sent by mail from a distance. The writer is trying this with apples and grapes.

In case of the *Mimulus* above mentioned the third generation of self-fertilized plants were allowed to fertilize themselves spontaneously. Another lot were grown beside them from crossed seeds. "The crossed plants produced a large number of capsules, whilst the self-fertilized produced very few and poor ones." The seeds in the crossed-capsules excelled those self-fertilized as 100 exceeds 34. Experiments were made with these two lots of seeds showing "in a decisive manner the superiority in constitutional vigor of the crossed over the self-fertilized plants." The flowers of self-fertilized plants in the experiments made became more uniform than those which were crossed. This was quite marked with *Mimulus*, *Ipomœa*, and *Dianthus*. Mr. Henslow raises the query, why is this when wild flowers are so uniform? These are certainly many times abundantly crossed and often appear much alike even when growing in different localities quite remote from each other on a great variety of soils.

OBSTACLES SHOW QUALITY.

In comparing the crossed with the self-fertilized plants Mr. Darwin usually placed one of each at the same time on different sides of the same pot. Mr. Henslow objects on the ground, if not crowded, the self-fertilized plants would be relatively better. In some cases, also, Mr. Darwin places two lots of plants in crowded masses in the same pot or box. In the third generation of *Petunia*

violacea "both lots grew extremely crowded; the crossed were twice as tall as the self-fertilized." Other examples of a similar nature are given in the book. Mr. Darwin, in volume II. of his *Animals and Plants under Domestication* says, "It is important that the two lots struggle with each other, for if sown with plenty of room and good soil, there is often but little difference in their growth." In other words the self-fertilized are more easily overcome by surrounding obstacles. Like pampered animals, they cannot endure great hardships. In cultivating plants on the farm and garden in many cases they are grown so close as to crowd each other. If so, seeds of crossed plants are generally the best, and most profitable to sow.

EFFECT OF LOCALITY.

Another fact mentioned in the case of *Escholtzia* is not a lone instance. In South America the self-fertilized flowers are sterile, while if seeds are sown in England the self-fertilized plants are the most productive and do the best. All these things show the great need of many more experiments, and the danger of drawing conclusions too hastily from limited experience. As Darwin says, "The fertility of a plant is a most variable element, depending on its age, health, nature of the soil, amount of water given and temperature to which it is exposed." To some extent we are groping in the dark. We do not know all the conditions about any one experiment.

Mr. Henslow brings up another point which should demand the careful attention of men of science. Many of our worst weeds are self-fertile. In a large majority of cases weeds are foreign invaders—natives of other countries, but this is not the case with all weeds. In some cases, the superior vigor of foreign weeds may be, and doubtless is to some extent due to a change of location. Why do our weeds thrive so well? The tallest cabbage plants are not always the best. In his experiments Mr. Darwin cut down and weighed the fully-grown plants. Six self-fertilized plants of the third generation when they had formed heads weighed 142.25 ounces; six plants from pollen of fresh stock weighed 649 ounces. That is, the six "crossed plants averaged 108.16 ounces, whilst the six finest self-fertilized plants averaged only 23.7 ounces, or as 100 to 22." Here again, we see an "enormous benefit" in favor of crossing a variety with foreign stock of the same variety, which had grown for a few years under different conditions.

DIFFERING RESULTS.

The scarlet runner bean (*Phaseolus multiflorus*), in one case when covered up yielded about one-third and in another case about one-eighth "of the number of pods which the same number of uncovered plants growing close along side produced. This lessened fertility was not caused by any injury from the wet," as some of the protected flowers were artificially fertilized and produced well. Dr. Ogle had tried a similar experiment with a total failure of fruit when the flowers were protected. *Phaseolus vulgaris*, a closely related species, proved highly fertile when insects were excluded. In England the varieties of the sweet-pea rarely or never cross when grown near each other. This may not be true in other places, as in Italy "it is the fixed opinion of gardeners there that the varieties do intercross," that they cannot be kept pure unless protected or sown in separate places. Let every person take warning from such examples and not draw hasty conclusions from one illustration or experiment, or the behavior of a single specimen. In some place a man does not see any bees

working on a certain kind of plant, when straightway he announces that bees do not work on that species. Perhaps the bees did work at other times of days; if not, perhaps they worked in other seasons or in other locations. Examples could be found to illustrate the above supposed cases. *Pisum sativum*, the common pea in England, was perfectly fertile without the aid of insects.

EARLY MATURITY GAINED.

I have said that plants crossed with a foreign stock were, in a great majority of cases later, larger, heavier, more vigorous, or better able to endure crowding by other plants. They also endure inclement weather better. In another respect Mr. Darwin has shown their superiority. In 50 cases the "period of flowering of the crossed and self-fertilized plants was recorded. In 44 of them a crossed plant flowered first either in a majority of the pots or in all: in nine instances a self-fertilized plant flowered first, and in five the two lots flowered simultaneously. One of the most striking cases is that of *Cyclamen*, in which the crossed plants flowered some weeks before the self-fertilized in all four pots during the two seasons." In some cases, as with *Lupinus luteus* and *Clarkia elegans*, the crossed and the self-fertilized plants in height were to each other as 100 to 82, yet *Clarkia* flowered first.

Numerous experiments showed that the crossing of one flower with that of another on the same plant, seldom if ever does any good. All the flowers are subjected to the same conditions. In tables given, "in 35 out of 50 flowers fertilized by pollen from a distant plant yield more, sometimes many more seeds than flowers fertilized with their own pollen, and they commonly set a larger proportion of capsules."

Considering all the facts brought forward, "it is difficult to avoid the suspicion that self-fertilization is in some respects advantageous," though he says, if this be really the case, the advantage is quite insignificant compared with that from a cross with a distinct plant, and especially with one of a fresh stock. In ten out of sixteen cases the self-fertilized seeds were either superior or equal to the crossed in weight. This the author partially accounts for "by the self-fertilized capsules containing fewer seeds," which on this account had a better chance to receive an abundant supply of nutriment.

EFFECT ON GERMINATION.

In twenty-one cases a record was kept of the relative period of germination of crossed and self-fertilized seeds. In one case the seeds germinated simultaneously; in ten cases the self-fertilized seeds germinated before the crossed, and in the other ten the crossed seeds germinated first. After knowing the great advantage to be derived from cross-fertilization, we are prepared to understand that honey is placed in flowers as wages to pay insects for serving the plants. The gay colors and odors are advertisements to call the attention of insects to the rich supplies of food in store for them. Saunders, of Canada, cut off the petals of raspberries, and by so doing made it difficult or impossible for the bees to find honey. "Almost every fruit which is devoured by birds presents a strong contrast in color with the green foliage, in order that it may be seen and its seeds freely disseminated."

NATURAL PROVISION FOR CROSSING.

Among many other topics of interest Mr. Darwin gives part of a chapter on the means which favor or ensure flowers being fertilized with pollen from a

distinct plant. We have seen that a cross of different flowers on the same plant does but little good. One insect will often visit an astonishingly large number of flowers in a small space of time. They cannot tell whether a flower contains honey or not till they try it. In this way any flower is frequently visited by many insects in turn, some of which will very likely bring pollen from other plants. A single plant of a species rarely grows alone. There are others near by. Dioecious plants * must be crossed. When monœcious † there is a good chance for a cross, especially where the anthers ripen before the pistils are ready for the pollen, or the reverse. The expansion of only one or a few flowers at a time on a plant favors a cross of two distinct plants. Dimorphous is a term applied to plants which have stamens and pistils of two different lengths. For example, the flowers of *Primula* on one plant will have all the pistils running to the top of the tube of the corolla, while the stamens will be below; yet on another plant the stamens may be near the top of the tube while the pistil is below. This is the case with *Bouvardia*, *Houstonia*, and many others. They are dimorphous. The long styles on one plant are more certain to be fertilized by the tall stamens, and when so crossed produce seeds best; while the short stamens or those low down are fitted to cross the short styles.

He planted a white kohl-rabi, a purple kohl-rabi, a Portsmouth broccoli, a Brussels sprout, and a sugar-loaf cabbage (varieties of one species) near together and left them uncovered. A majority of seedlings from these seeds in all five beds were mongrelized in the most complicated manner. Some other experiments were made with other plants giving similar results, as onions and mimulus.

DIFFERENCE IN POLLEN.

In numerous cases he placed pollen on the stigma from anthers of the same plant, and in twenty-four hours added pollen of another variety. In every instance some or all the pistils bore seeds which showed they were crossed by the last application of pollen. If one flower is fertilized with pollen which is more efficient than that applied to the other flowers on the same peduncle, the latter often drop off. This was shown by experiments of Herbert and others. The amount of pollen produced by plants which are dependent upon the wind to fertilize them is very large. Pollen in some cases drifts for hundreds of miles and rises to the height of 500 to 1,000 feet. This gives a great opportunity for many of our evergreens and other trees and plants to be crossed by distant plants.

BEEES AS SPECIALISTS.

Chapter eleven is devoted to the habits of insects in relation to the fertilization of flowers. From a previous paper read at the Michigan Bee-keeper's Convention the writer of this review remarked, that "Individual bees have been observed to behave differently about flowers, in some respects, from a majority of bees. Some are eccentric. They have their peculiarities. Nageli put artificial flowers to branches, and used essential oil on some, and on others he used no oil. The odor attracted them to the flowers containing it. Aristotle, 2,000 years ago saw that hive bees worked continuously on flowers of the same species. They even do so when the flowers are not all colored alike, as in

* Having male and female flowers on different plants.

† Having male and female flowers on same plant, but the sexual organs not in the same flower, as in Indian corn

some plants in our flower gardens. By this means they economize time. They get the hang of it. They learn how better to make more rapid motions, and to make every motion count. The same as is true of people who become expert in certain parts of any trade after much practice in often repeating the same operation."

A PRACTICAL SUGGESTION.

The twelfth and last chapter of this fertile book is devoted to general results. Like most of the other chapters, to do it justice would require long quotations. The seeds from a plant are benefited by the flowers having been fertilized by pollen of another plant which had been subjected to quite different conditions. This is brought about in many instances in the same spot where seeds have lain covered or dormant for some years, and then are turned up or placed in favorable condition to grow and mix with plants from seed produced in later years. Seeds are no doubt influenced by being kept for a long time. "Those which were matured during different seasons, will have been subjected during the whole course of their development to different degrees of heat and moisture." "It is a common practice with horticulturists to obtain seeds from another place having a very different soil so as to avoid raising plants for a long succession of generations under the same conditions; but with all the species which freely intercross by the aid of insects or the wind, it would be an incomparably better plan to obtain seeds of the required variety, which had been raised for some generations under as different conditions as possible, and sow them in alternate rows with seeds matured in the old garden. The two stocks would then intercross, with a thorough blending of their whole organizations, and with no less of purity to the variety; and this would yield far more favorable results than a mere exchange of seeds."

Agricultural College, Lansing, Mich., August, 1877.

METEOROLOGICAL ABSTRACT FOR THE YEAR 1877.

THE WEATHER AND THE CROPS.

The year 1877 has been exceedingly favorable to the farmer and fruit-grower. The temperature of the year, as a whole, has been mild and equable. During the winter months the temperature did not sink so low as to damage fruit trees to any extent, nor were there any sudden and great variations in temperature,—so injurious to fruit. The total rain-fall was far above the average in quantity, and so evenly distributed during the season of growth that no crop suffered greatly for want of water.

Among farmers the year will be remembered as Michigan's great wheat year. This is largely owing to the fact that, during the season of growth, the wheat was not checked by drouth, the rain-fall being abundant, and the temperature was very favorable. During wheat harvest almost no rain fell in any part of the State, and wheat was harvested generally without being injured by the weather. Whether a year shall be a year of plenty or scarcity, seems to be owing to that combination of climatic conditions which we call the weather. It is almost an axiom in agricultural operations that the weather makes the crops.

METEOROLOGICAL OBSERVATIONS.

I am under great obligations to Dr. H. B. Baker, Secretary of the State Board of Health, who has allowed me to use the meteorological records, kept by observers in different parts of the State who have reported to the State Board of Health. By this means, I am enabled to compile tables showing the general character of the season, so far as temperature and rain-fall are concerned.

The following are the names and addresses of persons who have reported to the State Board of Health, whose meteorological records have been used in preparing tables:

C. Henri Leonard, M. D., Detroit; F. W. Higgins, Woodmere Cemetery, near Detroit; L. P. Alden, State Public School, Coldwater; J. H. Kellogg, M. D., Battle Creek; Prof. L. McLouth, State Normal School, Ypsilanti; E. H. Van Deusen, M. D., State Asylum for Insane, Kalamazoo; E. Hause, M. D., and H. Peters, M. D., Tecumseh; John Bell, M. D., Benton Harbor; Lee S. Cobb, Nirvana, Lake county; H. T. Calkins, M. D., Fyfe Lake, Grand Traverse county; E. Stewart, M. D., Mendon, St. Joseph county; J. S. Caulkins, M. D., Thornville, Lapeer county; Prof. R. C. Kedzie, Agricultural College, Lansing.

TEMPERATURE.

The following table shows the average temperature of different places, and the average of all places, for the year, by months:

PLACES OF OBSERVATION.	AVERAGE TEMPERATURE OF MONTHS.											
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Detroit.....	20°.3	33°.2	26°.7	46°.0	57°.7	67°.2	72°.1	71°.6	64°.6	53°.8	39°.9	-----
Woodmere Cemetery....	17°.9	30°.8	24°.9	45°.4	56°.8	66°.4	71°.3	69°.7	62°.1	52°.5	37°.7	37°.2
Kalamazoo.....	18°.0	32°.9	24°.8	46°.6	59°.3	67°.3	71°.7	69°.9	63°.1	49°.9	35°.9	38°.5
Battle Creek.....	20°.0	33°.6	28°.5	47°.2	60°.9	69°.7	75°.0	72°.0	64°.1	53°.7	37°.2	40°.0
Coldwater.....	21°.1	34°.0	26°.5	47°.9	-----	68°.5	72°.7	70°.5	64°.9	56°.5	37°.9	35°.1
Ypsilanti.....	20°.5	32°.4	28°.7	48°.4	58°.7	67°.7	73°.1	73°.3	66°.3	54°.1	37°.1	-----
Tecumseh.....	19°.7	33°.2	26°.3	47°.5	58°.2	68°.8	73°.2	72°.2	63°.8	52°.5	37°.2	36°.8
Benton Harbor.....	21°.3	32°.7	28°.3	48°.6	61°.3	65°.6	73°.3	70°.8	66°.3	55°.1	37°.8	41°.5
Wyfe Lake.....	-----	28°.3	19°.0	41°.5	53°.3	62°.3	70°.1	67°.8	61°.5	46°.8	33°.3	-----
Thornville.....	19°.2	32°.1	24°.9	44°.5	57°.5	67°.5	72°.2	70°.5	63°.5	51°.7	37°.0	38°.2
Mendon.....	19°.9	33°.5	25°.1	47°.7	59°.8	67°.5	71°.3	69°.0	58°.8	52°.5	35°.8	38°.7
Nirvana.....	11°.9	26°.9	21°.0	43°.7	58°.4	66°.2	72°.7	67°.4	62°.3	49°.2	33°.7	35°.7
Agr'l College.....	18°.1	32°.3	24°.5	46°.2	58°.3	65°.9	71°.4	68°.5	61°.3	50°.8	35°.2	36°.6
Average.....	19°.7	32°.0	25°.3	46°.2	58°.5	67°.0	72°.5	70°.2	63°.3	52°.2	36°.6	37°.8

Average temperature of year, 48½°.

This table is calculated from observations taken three times daily, viz.: 7 A. M., 2 P. M., and 9 P. M. From examination of the table it appears that different places vary greatly in their average temperature, and that the temperature of places in the northern part of the State is lower than in the southern, as would be expected. Contrary to the general rule, the month of November of this year was much colder than December. During the first part of November, snow fell in many parts of the State, and for that time of the year, the weather was very cold. Whereupon several of the "weather prophets" rushed to the front, and announced that the winter of 1877-8 would be one of the coldest ever known: that during the latter part of December we should experience some very severe winter weather. How well have these predictions been verified? During December the air was moist and balmy, and the weather was more like that of April than December. In many places, farmers plowed during the latter part of the month, and the "oldest inhabitants" said that such pleasant weather had not been known in December before, for over thirty years! This shows the folly of a person's attempting to predict the weather if he uses any of the popular weather signs, his feelings, or the almanac, as his data of calculation.

The temperature of this year is slightly above the average, as appears from the following table giving the average temperature by months from the year

1864 to 1876 inclusive; calculated from observations taken at the Agricultural College:

MONTHS.	Average Temperature.	MONTHS.	Average Temperature.
January.....	22°.2	July.....	72°.0
February.....	23°.5	August.....	69°.1
March.....	31°.3	September.....	60°.0
April.....	45°.6	October.....	47°.1
May.....	58°.4	November.....	35°.1
June.....	69°.0	December.....	24°.4

Average temperature of thirteen years 46°.5.

MAXIMUM AND MINIMUM TEMPERATURES.

The extremes of temperature during the year have not been very great, the highest temperature in the shade being 93°, and the lowest 14½° below zero. The extremes of temperature by months, for this place, are shown in the following table:

PLACE OF OBSERVATION—AGRICULTURAL COLLEGE.

1877. MONTHS.	Highest Temperature.	Lowest Temperature.	1877. MONTHS.	Highest Temperature.	Lowest Temperature.
January.....	45°	*-09°	July.....	91°	43°
February.....	56°	10°	August.....	93°	43°
March.....	51°	*-14°	September.....	85°	38°
April.....	81°	18°	October.....	87°	26°
May.....	90°	26°	November.....	50°	4°
June.....	89°	40°	December....	58°	13°

* Below zero.

Space will not allow us to give the maximum and minimum temperatures of all the places. But the above table probably represents the variations in temperature for all parts of the State except in the extreme north. It is a little singular that the days upon which the maximum and minimum temperature in one place occur, are almost exactly identical with those of other places in the State, for this year, so far as I have examined the records.

RAIN-FALL.

The following table shows the amount of rain and melted snow for various places, by months:

RAIN AND MELTED SNOW—1877.

PLACES OF OBSERVATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	TOTAL.
Detroit	1.23	.04	5.43	3.27	.80	4.80	1.57	7.25	.39	4.70	4.06	-----	-----
Woodmere Cemetery.	1.52	.01	5.49	2.42	.86	4.79	2.42	7.82	1.18	4.24	3.60	1.76	36.11
Kalamazoo.....	1.91	.12	7.33	3.89	2.10	5.67	6.50	4.18	2.55	5.27	5.77	2.48	48.77
Battle Creek.....	.50	.00	.50	-----	1.50	4.25	4.85	-----	1.06	2.94	4.12	1.08	-----
Coldwater.....	1.60	.00	1.50	3.09	1.55	6.17	5.30	4.03	1.95	5.95	4.38	1.60	27.12
Ypsilanti.....	1.12	.00	4.02	2.90	.82	5.13	1.34	5.23	.60	5.08	6.07	-----	-----
Tecumseh.....	1.17	.00	4.50	3.03	.88	4.72	1.41	3.80	.90	4.35	4.34	1.58	30.68
Benton Harbor.....	-----	-----	-----	-----	1.98	4.31	1.92	3.12	-----	6.10	3.91	1.49	-----
Fyfe Lake.....	-----	.00	.90	2.00	1.21	3.60	2.06	4.89	2.19	2.73	-----	-----	-----
Thornville.....	-----	.00	4.67	2.75	1.63	2.54	1.78	6.69	1.31	4.72	3.19	1.53	-----
Mendon.....	2.75	.00	7.02	2.99	1.81	6.20	5.54	3.31	1.51	4.17	4.98	2.31	42.59
Nirvana.....	2.48	.09	3.67	2.06	1.99	4.06	2.99	4.42	1.27	9.79	4.48	2.11	39.44
Agricultural College.	1.33	.00	5.60	4.14	2.23	3.53	2.25	6.57	1.38	5.69	3.67	1.03	37.42
Average.....	1.56	.02	4.22	2.95	1.49	4.60	3.07	5.02	1.36	5.06	4.41	1.70	-----

Average rain-fall for the year 35.47 inches.

The annual rain-fall at the Agricultural College, the average of thirteen years' observation, is 30.47 inches, varying from 24.57 inches in 1867 to 39.51 inches in 1866, and therefore the rain-fall for the year is five inches above the average.

During the month of February almost no rain or snow fell anywhere in the State, so far as known. June is usually our rainiest month, but this year the rain was quite evenly distributed through the months of June, July, and August, and the largest amount fell in October. It is not so much the amount of rain that falls during the year as the regularity with which it comes during the season of vegetable growth, to supply the necessary moisture to crops, that gives us bountiful harvests.

CONCLUSION.

It is to be regretted that observations from the fruit region of the State could not have been combined with those from other portions, in making the tables showing the temperature and rainfall for the year. It is to be hoped that during the present year, observations may be taken in places on the western side of the State, near Lake Michigan. These, combined with observations from other places, will give reliable data from which definite conclusions may be drawn concerning the vexed question of our meteorology.

R. F. KEDZIE.

Agricultural College, January 14, 1878.

STATEMENT OF FINANCES.

The financial statement of the State Pomological Society, Dec. 31, 1877, is a very pleasant one to place before the people: and as exhibiting the condition of the treasury at this date, the following summary of receipts and expenditures is given:

STATEMENT OF RECEIPTS.

Amount on hand January 1st, 1877.....	\$169 41
Interest on mortgage and notes.....	132 00
Annual memberships taken during year.....	106 00
Sale of paper plates.....	5 00
Sale of fruit.....	2 00
Appropriation of State Agricultural Society for expenses.....	1,400 00
Total receipts.....	<u>\$1,814 41</u>

STATEMENT OF EXPENDITURES.

Secretary's salary.....	\$600 00
Stamps, stationery, etc., Secretary's office.....	36 90
Back reports and exchanges.....	31 36
Report of 1877.....	31 45
Expenses of Executive Committee.....	113 26
President's office.....	13 70
Treasurer's office.....	31 35
Treasurer's last bill (mostly State Fair).....	84 25
State fair.....	226 37
Premium of last year.....	5 00
Printing.....	13 50
Report of 1876.....	30 80
Advertising.....	15 82
Traveling expenses of Secretary.....	16 40
Delegate to Western New York Horticultural Society.....	32 28
Appropriated for diploma.....	250 00
Appropriated for plates.....	180 00
Appropriated for clasps.....	63 00
Total expenditures.....	<u>\$1,775 44</u>

Balance on hand.....	<u>\$38 97</u>
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LIFE MEMBERSHIP FUND.

The life membership has been, during the year, but little increased in aggregate amount, but as the hard times are on the wane we hope for a large accession to this fund during 1878. The account with the fund stands as follows:

Amount of life fund Jan. 1, 1877.....	\$1,320 60
Added during the year three memberships, at \$10.....	30 00
Total.....	<u>\$1,350 00</u>

LIFE MEMBERS OF THE STATE POMOLOGICAL SOCIETY.*

Adams, H. Dale, Galesburg, Kalamazoo county.
Archer, Thomas, St. Joseph, Berrien county.
Armitage, James, Monroe, Monroe county.
Arnold, W. D., Ionia, Ionia county.
Avery, C. P., Old Mission, Grand Traverse county.
Bagley, John J., Detroit, Wayne county.
Baldwin, H. P., Detroit, Wayne county.
Ball, John, Grand Rapids, Kent county.
Bates, T. T., Traverse City, Grand Traverse county.
Beal, W. J., Lansing, Ingham county.
Bradfield, Edward, Ada, Kent county.
Bragg, L. G., Kalamazoo, Kalamazoo county.
Bruchner, George W., Monroe, Monroe county.
Burham, W. P., Ionia, Ionia county.
Burrows, George L., Saginaw City, Saginaw county.
Bullock, B. D., Jackson, Jackson county.
Bidwell, H. E., South Haven, Van Buren county.
Bailey, L. H., South Haven, Van Buren county.
Bryant, C. T., South Haven, Van Buren county.
Chandler, Z., Detroit, Wayne county.
Cook, A. J., Lansing, Ingham county.
Curtis, H. W., Old Mission, Grand Traverse county.
Chapman, H. B., Reading, Hillsdale county.
Chilson, Nathaniel, Battle Creek, Calhoun county.
Crosby, M. S., Grand Rapids, Kent county.
Castello, George, Saginaw City, Saginaw county.
Cooper, George S., Ionia, Ionia county.
Chapman, Austin B., Rockford, Monroe county.
Cooley, Elisha, Jackson, Jackson county.
Dickinson, Geo. W., Grand Rapids, Kent county.
Dietrich, C. J., Evansville, Indiana.
Dyckman, A. S., South Haven, Van Buren county.
Dyckman, J., East Saginaw, Saginaw county.
DeLisle, Wm. H., Bay City, Bay county.
Dixon, A. S., East Saginaw, Saginaw county.
Doyle, Thomas, Monroe, Monroe county.
Dean, A. J., Adrian, Lenawee county.
Davis, P. C., Kalamazoo, Kalamazoo county.
Dieckman, Mrs. Josephine M., East Saginaw, Saginaw county.
Fields, Miss Jennie E., East Saginaw, Saginaw county.
Fuller, Samuel L., Grand Rapids, Kent county.
Ferry, T. W., Grand Haven, Ottawa county.
Foster, W. D. (deceased), Grand Rapids, Kent county.
Griggs, G. W., Grand Rapids, Kent county.

*A Life Membership is \$10. This fund is invested permanently on real estate security. The principal is not touched; the interest only is used.

Gilbert, John (deceased), Ovid, Clinton county.
 Geddes, David, Saginaw city, Saginaw county.
 Greening, J. C., Monroe, Monroe county.
 Guild, E. F., East Saginaw, Saginaw county.
 Humphrey, J. W., South Haven, Van Buren county.
 Hannah, Perry, Traverse City, Grand Traverse county.
 Haviland, J. B., Traverse City, Grand Traverse county.
 Husted, James D., Lowell, Kent county.
 Husted, Noah P., Lowell, Kent county.
 Hall, Frederick, Ionia, Ionia county.
 Hathaway, B., Little Prairie Ronde, Cass county.
 Hanford, H. P., Bristol, Indiana.
 Hayden, Mrs. H. A., Jackson, Jackson county.
 Hgenfritz, I. E., Monroe, Monroe county.
 Hgenfritz, C. A., Monroe, Monroe county.
 Hves, Caleb, Monroe, Monroe county.
 Jerome, Mrs. David H., Saginaw City, Saginaw county.
 Johnson, William, Vassar, Tuscola county.
 Knapp, S. O., Jackson, Jackson county.
 Knapp, E. U., Grand Rapids, Kent county.
 Kedzie, R. C., Lansing, Ingham county.
 Kelsey, E. P., Ionia, Ionia county.
 Kidd, J. H., Ionia, Ionia county.
 Littlejohn, F. J., Allegan, Allegan county.
 Linderman, A. T., South Haven, Van Buren county.
 Lincoln, L. C., Greenville, Montcalm county.
 Loomis, P. B., Jackson, Jackson county.
 Linderman, Harvey, South Haven, Van Buren county.
 Lyon, T. T., South Haven, Van Buren county.
 Mitchell, W. H. C., Traverse City, Grand Traverse county.
 Marshall, William A., Old Mission, Grand Traverse county.
 Montague, A. K., Traverse City, Grand Traverse county.
 Mason, L. M., East Saginaw, Saginaw county.
 McCallam, E. H., Old Mission, Grand Traverse county.
 Monroe, Judge (deceased), Lawrence, Van Buren county.
 Mason, Mrs. Sarah A., East Saginaw, Saginaw county.
 McClatchie, G. C., Ludington, Mason county.
 Mann, S. B., Adrian, Lenawee county.
 Noble, W. A., Monroe, Monroe county.
 Pearsall, S. M., Alpine, Kent county.
 Petty, Thomas, Spring Lake, Ottawa county.
 Parmelee, George, Old Mission, Grand Traverse county.
 Parmelee, Mrs. George, Old Mission, Grand Traverse county.
 Parke, Mrs. Amos S., East Saginaw, Saginaw county.
 Reynolds, E. H., Monroe, Monroe county.
 Reynolds, H. G., Old Mission, Grand Traverse county.
 Ransom, W. B., St. Joseph, Berrien county.
 Rose, D. Forsyth, East Saginaw, Saginaw county.
 Renwick, T. R., Grand Rapids, Kent county.
 Rich, Hampton, Ionia, Ionia county.
 Rust, C. E., Ionia, Ionia county.
 Ramsdell, J. G., Traverse City, Grand Traverse county.
 Ramsdell, Mrs. J. G., Traverse City, Grand Traverse county.
 Rowe, William N., Grand Rapids, Kent county.
 Root, Amos, Jackson, Jackson county.
 Rose, Mrs. Sophie E., East Saginaw, Saginaw county.
 Slayton, Asa W., Grattan, Kent county.
 Staunton, G. W., Grand Rapids, Kent county.
 Savidge, Hunter, Spring Lake, Ottawa county.
 Sleeper, F. S., Galesburg, Kalamazoo county.
 Soule, J. B., Fruitport, Muskegon county.
 Sterling, F. S., Monroe, Monroe county.
 Sterling, J. M., Monroe, Monroe county.
 Sterling, J. C., Monroe, Monroe county.
 Sterling, W. C., Monroe, Monroe county.
 Sterling, W. P., Monroe, Monroe county.

Sterling, Mrs. Emma, M., Monroe Monroe county.
Shirts, E. J., Shelby, Oceana county.
Suttle, John, Grand Rapids, Kent county.
Smith, E. T., Ionia, Ionia county.
Smith, N. E., Ionia, Ionia county.
Stearns, J. N., Kalamazoo, Kalamazoo county.
Sessions, Alonzo, Ionia, Ionia county.
Sessions, William, Ionia, Ionia county.
Sigler, Artemus, Adrian, Lenawee county.
Sinclair, W. G., Spring Lake, Ottawa county.
Smith, H. H., Jackson, Jackson county.
Tracy, Will W., Old Mission, Grand Traverse county.
Thompson, J. P., Detroit, Wayne county.
Taylor, George, Kalamazoo, Kalamazoo county.
Towles, Geo. W., Benton Harbor, Berrien county.
Thompson, W. D., Jackson, Jackson county.
Vick, James, Rochester, New York.
Wells, H. G., Kalamazoo, Kalamazoo county.
Williams, S. P., Monroe, Monroe county.
Wier, Antoine, Monroe, Monroe county.
Webber, Geo. W., Ionia, Ionia county.
Webber, Miss Francis E., East Saginaw, Saginaw county.
Wooding, Charles F., Lowell, Kent county.
Winchester, A. O., St. Joseph, Berrien county.
Wurtz, Elias H., East Saginaw, Saginaw county.
Whittlesey, John, St. Joseph, Berrien county.
Zeigler, J. C., Saginaw City, Saginaw county.

INDEX.



A.

	PAGE.
Acids of Fruits,	155
Adams, H. Dale, on Crab Apples,	25
Growing Flowers,	325
Address of C. J. Monroe at South Haven,	77
T. T. Lyon at Pontiac,	27
C. N. Merriman at Pontiac,	4
Byron G. Stout at Pontiac,	13
Henry W. Lord at Pontiac,	42
Prof. C. L. Ingersoll at Pontiac,	58
A. S. Dyckman at South Haven,	121
Mayor Thayer at Grand Rapids,	216
Adornment of Homes,	440
Adrian Horticultural Society, Report of	331
A Fact Regarding Bearing,	407
Age in which we Live,	100
Age of Plant Influencing Leaf and Flower.	371
Agents, Fruit Tree,	231
Alexander Peach, The	401
Alkaloids of Fruits,	158
Allegan Fruit Prospects,	1
A Man in the Garden,	53
American Grape Mildew,	134
Bulbs,	446
Annuals for the Border,	52
and Perennials for Home Culture,	119
Annual Exposition for 1877,	177
Meeting, Report of	200
Apples and Pears at Berrien Springs,	403
Use of	383
Preservation of	408
at the Winter Meeting,	71
Apple Cellar or Keeping Room,	409
Orchards, Prominent, in Michigan,	246
Orchard, Site of an	14
Crop, Predicted by the Blossom,	19
Crops, Alternate Years,	407
Shall we Increase it?	13
Sauce, How to Make,	7
Trees, Controlling Bearing Year of	405
Arboriculture,	441
Arranging Cut Flowers,	424, 426
Artificial Watering,	124
Attractive Flower Garden,	416
Atmospheric Drainage,	308, 391
Autumn Gardening,	428
Awards at the Annual Exhibition,	180

B.

	PAGE.
Balance of Root and Branch, To Preserve,	171
Balsams, Management of,	421
Beal, Prof. W. J., on the Most Promising Field for Experiment,	321
Horticultural Experiments,	26
Growing Vegetables,	327
Report of Orchard Committee,	244
Beans, Time of Ripening,	429
Bearing, How to Induce Regular,	83
Bearing Year of Apple Trees, controlling,	405
Beautifying the Home, a Family Work,	64
Bedding Plants,	419
Berrien county, Shipments of Fruit from,	208
Bidelman, Eli, on Fruits about Coldwater,	76
Biennial Bearing Apple Trees,	405
Birds our Friends,	115
Blackberries, Varieties of, for Central Michigan,	338
Blackberry Rust,	109
Blackhearted Trees,	3
Black-rot in Grapes,	239
Blossoms of the Apple unfruitful,	19
Bort, William, Tribute to the Memory of,	56
Bradfield, E., on Failures in Grape Growing,	213
Branch county Fruit,	76

C.

Cabbage Butterfly,	66, 435
Cabbages Destroyed by Worms,	67
Cabbage Worm Remedy,	436
Calhoun County, Report from,	209
Campbell, George W., on the Newer Grapes,	204
Canker Worms in Lenawee County,	25, 109
New Fact Regarding,	111
How to Fight,	110
Care of Newly Planted Trees,	13
Cass County Fruit Growing,	2, 201
Catalogue of Fruits, Value of a Good,	294
the London Horticultural Society,	30
Celery, How to Winter,	432
Changing the Bearing Year,	406
Characteristics of a good Experimenter,	26
Cheap Fruit a Desideratum,	19
Chemistry of Fruit Ripening,	149
Cherry, Bigarreau, at Little Point au Sauble,	401
Cherry Trees, Varieties for Market,	111
Orchard, the Premium,	264
Cions, Discussion on,	71
Circulation of Sap,	340
Classical versus Scientific Studies,	162
Classification of Fruits, by T. T. Lyon,	27
Clematis Jackmanii,	418
Climate of the Traverse Region,	306
Coal tar in Pruning,	384
Codling moth, Remedy for,	209
How to Fight the,	6
Coldwater Horticultural Club, Officers of,	339
Cold Winter of 1874-5, Lessons from,	390
Collection of Artificial Fruit in Wax,	10
Comings, S. H., on Cranberry Culture,	201
Committees Appointed at Pontiac Meeting,	4
Annual Meeting,	215
Reports at Annual Meeting,	321
Committee on Apples, Report of at Pontiac,	71

	PAGE.
Controlling the Bearing Year in Orchardng,	83
Of Apple Trees,	105
Cook, Prof. A. J., on the Mole,	89
Cabbage Butterfly,	66
Phylloxera,	238
Cranberries,	401
Cranberry Culture in Ottawa County,	375
Michigan,	201
Cross and Self-Fertilization of Plants,	454
Cross-Breeding Grapes,	203
Crossing Fruits,	27
Cureulio, Method of Fighting,	6
Currant Worms, New Fact Regarding,	112
How to Destroy,	435, 436
Currants, Plat of,	257
Cut-Flowers,	422

D.

Darwin's new book,	454
Death of John Suttle,	199
December Meeting, report of,	200
Decorative Plants,	416
Deterioration of Varieties	104, 374
Difficulties in Making Experiments,	26
Diploma of the Society,	282
Discouragements for Tree Planters,	5
Diseased Trees, Discussion on,	4
Discussion on the Bearing Year of Apple Orchards,	83
What native Shrubs and Trees to plant about a Home,	85
What are the Prominent Errors made by Beginners in Grape Culture?	87
The Mole, What is He Good for?	89
Use of Evergreens in Protecting Orchards,	93
Varieties of Cherries for Market,	111
The Best Annuals and Perennials for Home Culture,	119
Water in Horticulture,	124
Methods of Exhibiting Fruit,	210
Rotation of Crops in Horticulture,	214
The Winter House Garden,	222
Management of Fruit Tree Agents,	231
Preparing Fruit for Market,	236
Dispersion of Plants, Natural,	452
Disposition of the Life Membership Fund,	65, 66
Distribution of the 1876 Reports,	282
Diurnal opening of Flowers,	453
Drainage and Cultivation of Orchards,	58
Dumelow Apple,	3
Dyckman, A. S. on Manufacture of Wine and Cider,	121

E.

Eastern Trees, Value of,	3
Economy of Irrigation in the Orchard,	15
in marketing Fruits,	36, 299
Educational Training by Prof. Prentiss,	160
Effect of Drainage on Fruit Trees,	60
Effects of Pruning,	389
Election of Officers for 1878,	290
Elision of Roots,	169
Embellishing the Farm,	295
Engle, C., on Pears for Western Michigan,	92
Entries at the Annual Exposition. Notes on,	177
Errors by Beginners in Grape Culture,	87
in Fruit Growing,	362

	PAGE,
Esthetic Culture	162
Evaporation Through the Leaves,	343
Evergreens and their Uses, by H. W. Lord,	42
for Protection,	45
Hedges,	46
Fences,	47
and Pasturing,	50
for Orchard Protection,	93
Transplanting of,	174, 396
Evergreen Plantations,	444
Executive Committee, Meetings of,	74, 129, 131, 197, 215
Exhibiting Fruit, Methods of,	210
Experience in Pruning,	20
Marketing,	37-40
Experiment in Picking Apples,	17
Keeping Apples,	409
Experiment, Where to	200
Can Farmers,	317
Experiments, Cost of,	316
Scientific and Practical,	318
False Deductions from,	319
on Cross and Self-Fertilization of Plants,	454
Exportation of Michigan Apples,	18
F.	
Failures in Growing Grapes,	213
Fair, Grapes for,	401
Fall or Spring for Transplanting,	394
Setting of Blackberries and Raspberries,	398
Farm Adornment,	295
Farmers' Gardens,	427
February Meeting at Pontiac,	1
Feed for Apple Trees,	13
Feeding Apple Trees,	84
Plants,	449
Fences Costly Affairs,	47
Fern, the Hartford for Ornament,	219
Case, how made,	13
Fertility of Orchards, How to Increase,	378
Fertilizing Orchards,	107
Fertilizers for the Garden,	430
Orchard,	365
Financial Statement of Secretary,	283
Fisk, Mrs. J. D. W., on Sap Circulation,	340
Flavoring Ethers of Fruits,	158
Floriculture on the Farm,	410
Flower Beds,	414
Flower Garden, Hints for,	410
Flowers, Diurnal Opening of,	453
at the Winter Meeting,	54
for the Farmer,	58, 298
Success with,	422
The Way to Cut,	423
Preservation of,	424
How to Arrange,	424-426
What are they Good For?	64
Flower Gardening as a Home Accompaniment,	150
Garden, my, by H. D. Adams,	325
Forests require Protection,	441
Forestry, Resolutions on,	442
Form of Tree Top,	22, 23
Fowler, S. W., on Manistee Fruit Region,	324
Frosts, Early and Late, Protection from,	5
Frozen Plants, How to treat,	445

	PAGE.
Fruit Prospects in Allegan County,	1
in Cass County,	2
as a Part of a Good Living,	7
versus Hog,	7
Exhibit at South Haven Meeting,	107, 126
Packages, Report of Committee on,	126
Products, Classes of,	151
Shipments from Berrien County,	208
Tree Agents, How to treat,	231
Garden of H. E. Bidwell,	270
H. B. Chapman,	271
near Allegan,	403
as Food,	272
Trees, Where to Purchase,	357
growing at Manistee,	324
capabilities of the Traverse Region,	302
interests, increase of, at South Haven,	402
Fruits at Annual Meeting,	322
Fund, Disposition of Life Membership,	65, 66
Future work of the Society,	284

G.

Garden Seeds, Home grown,	428
Syringe,	426
The Flower,	325
Gardening,	343
Garfield, C. W., on Landscape Gardening for Farmers,	63
Transplantation,	168
The Window Garden,	223
Report as Secretary,	276
How shall we Experiment?	309
Garnishing Fruit with Leaves,	445
Gathering, Storing and Wintering Apples,	339
Apples,	16
Geological Survey of Michigan, criticism on,	302
Germination of Seeds,	373
Gibson, W. K., on Flowers,	119
Gilbert, John, Tribute to the memory of,	55
Good Living with Fruit in It,	7
Grafting and after care of Clons,	15
Grand Traverse Region as a Fruit country,	302
County Fruits in,	399
Grand River Valley Horticultural Society, Report of,	329
Grape culture, Errors made in,	87
mildew,	134
growing, my Failures in, by E. Bradfield,	213
Phylloxera,	238
vines, planting out young,	394
vine experiment with long arm,	370
Grapes, long-armed,	401
the most Promising, by Geo. W. Campbell,	204
most subject to Mildew,	140, 141
method of keeping,	57
and Peaches at Ionia,	403
and Canned Fruits at the Winter Meeting,	54
for the Fair,	401
Green manuring,	107
Greene, Mrs. A. E., on Flower Gardening,	50
Growing Peaches for Market,	144
vegetables,	327
Guild, E. F., on Preserving Grapes,	57
Flowers at State Fair,	289
Gulley, A. G., Report of, as member of Orchard Committee,	266
Gypsum in the Orchard,	5

H.

	PAGE.
Habits of Birds,	115
Halstead, B. D., on Grape Mildew,	134
Hartford Fern in Home Decoration,	219
Haskell's Hybrid Grapes,	203
Hathaway, B., on Field for Horticultural Experiment, New Varieties,	200 77
Helps and Hindrances to Pomology of Michigan,	4
Henderson's Plan of Growing Strawberries,	173
Hillsdale county, Report from,	208
Hints for the Flower Garden,	410
Holmes, Prof. J. C., on Phylloxera,	243
Home Orchards versus Market Orchards,	291
Honesty in Marketing Fruit,	37
Horticultural Club at Coldwater,	339
Horticultural Experiment,	20, 77, 309
Horticulture, Yesterday, To-day, and To-morrow,	225
House Plants, Discussion on	329
How to Water,	224
How to Make Good Apple Sauce,	7
Save the Apple Crop,	16
Dispose of the Apple Crop,	18
Shall we Experiment?	309
to Cut Flowers,	423
Hybrid Versus Seedling Grapes,	204-207

I.

In and about the House,	445
Inaugural Address by President Lyon,	7
Increase of the Apple Crop,	13
Influence of Age on Leaf and Flower,	371
a Plant,	422
Stock on Graft,	451
Ingersoll, Prof. C. L., on Orchard Drainage and Cultivation,	58
Ingham County Farmers' Club,	335
Insects Injurious to Fruit,	6
upon Plants in the House,	12
Ionia County Fruit Prospects,	209
Irrigating Strawberries,	125
Irrigation, Natural	124
in the Orchard,	15
Ivy for Decorative Purposes,	418

J.

June Meeting at South Haven,	76
--	----

K.

Kalamazoo, L. G. Bragg & Co.'s Nursery at,	403
Kalamazoo County, Report from,	209
Kedzie, R. F., on Food Value of Fruits,	272
Report of, as Meteorologist,	461
Keeping Grapes,	57
Knapp, S. O., on Tropical Plants,	120
Knight, Mrs. Sophia H., on Hartford Fern,	219

L.

Lake Shore Pomological Society, Report of,	334
Landscape Gardening,	439
for Farmers,	63
Large Peach Trees at South Haven,	402
Trees from the Nursery,	171

	PAGE.
Law concerning Tree Planting and Preservation,	10
Lawn, value of a Good,	361
Lawns made in Autumn,	444
How to make,	60
Leaves for Garnishing Fruit,	445
and Trees,	450
Legislation upon Forestry and Road Planting,	10
Lenawee County Fruit Growing,	202
Lessons from the Winter of 1874-5,	390
Library of the State Pomological Society,	279
Life Membership Fund, Disposition of,	66
Members of the State Pomological Society,	465
Lime for Codling Moth,	209
Linderman, I. S., on Soil and Climate of South Haven,	351
Economy in Marketing,	36
Liquid Fertilizers for House Plants,	12
List of 1,000 Apple Trees for Market,	380
Premiums awarded at State Fair,	180
Literature of Experiments,	310
Location for a Peach Orchard,	145
Long-armed Grapes,	401
Longevity of Varieties and Races,	104
Lord, Hon. Henry W., on Evergreens,	42
Low Branches for Apple Trees,	16
Heads for Orchards,	14, 24, 371
Lyon, T. T., Inaugural Address,	7
on the Best New Strawberries,	97
Home Orchards <i>vs.</i> Market Orchards,	291
Response to Mayor Thayer's Welcome,	218
on Fruit Catalogues,	27

M.

Management of Flowers,	411
Window Plants,	12, 51
Apples after Gathering,	17
Manistee Fruit Region,	324
Mann Apple,	58
S. B., on Fruits in Lenawee County,	24
Manual Labor System at Agricultural College,	166
Manufacture of Wine and Cider not Pomological,	121
Manure for the Garden,	430
Manuring Fruit Lands,	365
Orchards,	377
Markets,	299
Market Orchards <i>versus</i> Home Orchards,	291
Preparing Fruit for,	235
List of 1,000 Apple Trees for,	380
Markham, Byron, on Markets,	299
Matching Colors in the Garden,	413
McGowan, Mrs. J. P., on Gardening,	343
Meetings of Executive Committee,	74, 129, 131, 197, 215
Melons, how to Detect Ripe,	433
Memorial to the Governor, by President Lyon,	278
Merriman, C. N., Report as Member of Orchard Committee,	259
on Helps and Hindrances to Pomology,	4
Meteorological Recommendations,	10
Abstract for 1877,	461
Methods of Experimenting,	315
for Exhibiting Fruit,	210
of Destroying the Cabbage Butterfly,	69
Michigan Fruit at the Centennial,	8
Agricultural College, Value of Training at,	160
Muskegon Fruit Interests,	1

	PAGE.
Mildew on the Grape,	134
Illustration of,	135
Mistakes in Fruit Growing,	362
Moles, what are they Good for?	89
Experiment with,	438
Moody, Elisha, on the Mann Apple.	58
Monroe, Phylloxera at,	404
Nurseries at,	404
O. J., Address of, at June Meeting, on Pomology <i>versus</i> Farming,	77
Judge, Tribute to the Memory of,	348
Montcalm County, Report from,	56
	208

N.

Natural History of the Rose Beetle,	113
Dispersion of Plants,	452
Rotation of Plants,	452
Newly Planted Trees, Care of	13
New, What is	313
Nomenclature, Report of Committee on	64
Nurseries of Michigan,	271
at Monroe,	404
Nursery Stock, Where to Buy,	357
of L. G. Bragg & Co., Kalamazoo,	403
Nutritive Value of Fruits Compared with other Food,	272

O.

Ocean County, Fruits in,	400
Orchard Committee, Report of	180, 244
Notes from,	399
Drainage and Cultivation,	58
Pruning,	14
Orchards, Soils Collected from	401
Ornamental Tree Planting,	10
Grounds of Mrs. Dr. Tracy,	257
Mrs. Fred Bush,	258
Ornamentation of Gardens,	439
Farms,	443
Ottawa County, Report from	209
Our Friends, the Birds, by J. Satterlee,	115
Over-production in Apples,	19
Owen, J. S., on the Rose Beetle,	113
Woodland, on the Canker Worm,	109

P.

Packing Apples,	17
Palms for Decorative Purposes,	417
Pansies, Summer Treatment of,	421
Parlor and Window Plants,	446
Parmelee, George, Apple Orchard of,	244
on Pruning,	20
Peach Culture, Is It Desirable to Engage in,	144
Orchard, Location for a,	145
Trees for Planting, Selection of,	145
Orchards, The Best in Michigan,	266
Peaches for a Succession,	146
at Point au Sauble	401
Reading, Hillsdale Co.,	405
South Haven,	402
Plums and Pears at Paw Paw,	403
at the Winter Meeting,	54
for Western Michigan,	92

	PAGE.
Peaches, Lists of,	331
for Home Use,	38
Pear Trees Changing their Fruit,	451
Tree Culture,	332
Orchards of Michigan,	251
Peck, S. B., on Muskegon Fruit Interests,	1
The Age in Which We Live,	100
Pectous Substance in Fruits,	154
Permanent Fruit Catalogue, Sample of,	32, 33
Phylloxera, The Grape,	238
Physical Culture,	164
Picking Apples, Time of,	16
Plan of Proposed Fruit Catalogue,	32, 33
Plants, Decorative,	416
in the Window and their Treatment,	12, 223
for the Flower Garden,	50
and Flowers at June Meeting,	127
State Fair,	289
for Parlor and Window,	446
Planting of Fruit Trees,	173
and Protection of Shade Trees,	358
Young Trees,	393
Grape Vines,	394
an Orchard,	398
Plaster to Increase the Setting of Fruit,	5
Plates and Clasps for Fruit Exhibitions,	210
Plum Orchards, Prominent,	253
Plums at Rollin, Lenawee Co.,	405
Pomology versus Farming,	348
of Lenawee County,	24
at State Fair,	177
Pontiac Meeting, Account of,	1
Prejudice Removed by Thorough Experiment,	312
Premium List, How to Amend,	293
Premiums Awarded at State Fair,	180
Prentiss, Prof. A. N., on Training at Agricultural College,	160
Preparation for Flower Garden,	52
Prepared Seed,	429
Preparing Fruit for Market,	235
Prescott, Prof. A. B., on Chemistry of Fruit Ripening,	149
Preservation of Apples,	408
Preserving Flowers,	424
Progress in Horticulture,	225
Protection for Trunks of Trees,	14
by Evergreens,	45, 93
Evergreen Boughs for,	389
Limits of,	393
Pruning, Advice About,	14
by George Parmelee,	20
Roots before Planting Trees,	20
of Evergreens,	48
the Peach,	148
Ornamental Trees,	387
Grapes,	388
Purslane as a Weed,	434
Q.	
Quality versus Size,	383
Quince cultivation,	381
Quinces in Michigan,	256
R.	
Rainfall for 1877,	464
Ramsdell's Plum Orchard,	253
Ramsdell, J. G., on the Traverse Region,	302
Raspberries for Central Michigan, varieties of,	337

	PAGE.
Red Spider, Remedy for,	12
Registry of Entries at State Fair, Notes on,	178
Remedies for Low Prices,	37
Report of Committee on Nomenclature,	64
temporary committee on Fruit Lists,	87
committee on Fruit at South Haven,	107
Plants and Flowers at June Meeting,	127
the annual meeting,	200
Orchard committee,	180, 244
Superintendent Reynolds,	285
Guild,	280
Reports, collection of,	277
Back numbers of Pomological,	277
Resolutions on Death of Members,	11, 55
in Memory of John Suttle,	199
at June Meeting,	127
Response to an Address of Welcome, by H. D. Adams,	80
T. T. Lyon,	11
Reynolds, H. G., on How to Experiment,	318
Report of, as Superintendent of Pomological Hall,	285
Richard's Sweeting Apple,	378
Ripening of Pears,	382
Process, The Chemistry of the,	149
Robins, Discussion,	118
Room in the New Capitol,	9
Root-Pruning,	385
Young Trees,	20, 171
Roots of Trees in Tile,	62
the System of,	168
Rose Chafer, The,	113
Paris Green for,	112
Hand Picking of,	112
Rotation of Plants, Natural,	452
crops in Horticulture,	214
Rowe, W. Asa, on Small Fruits,	335
Rust on the Blackberry,	109

S.

Sale of Michigan apples,	18
Sample pages of Lyon's Fruit Catalogue,	32, 33
Sap, circulation of,	340
Where Does it Winter,	372
Satterlee, James, on Our Friends, the Birds,	115
How to Experiment,	316
Mrs. William on Window Gardening,	11
Saving the Apple Crop,	16
Scientific Horticultural Notes,	449
Training,	162
Versus Practical Knowledge,	168
Season for Trimming Trees,	21
Secretary's Report for 1877,	276
Portfolio, Introduction to	369
Sedums as Bedding Plants,	419
Seeds, Germination of	373
Home Grown Garden,	428
That Bore,	449
Selection of Plants for Window,	447
Fern Case,	13
Trees for Home Plantation,	85
Setting of Fruit, Controlling the	5, 16
Seymour, Henry, Tribute to the Memory of	57
Shade Trees, Discussion on	358
Shading Dwellings with Evergreens,	49
Shall we Increase the Apple Crop?	13
Sheds in the Orchard,	18
Short Bodies for Apple Trees,	14

	PAGE.
Shortening in Peach Trees,	22
Simplicity of Experimental Methods,	312
Site for an Apple Orchard,	14
Six Good Pears,	92
Slugs in Fruit Trees,	437
Small Fruits, A Plea for the Cultivation of for Profit,	335 356, 360
Soil and Climate of South Haven for Fruit Growing,	351
Soils for Fruits,	302
Collected from Orchards,	401
Sour Strawberries,	100
South Haven Meeting in June,	76
Pomological Society,	348
Sprouting Apple Trees,	18
Squashes, How to Keep,	423
Standing Committee on Meteorology,	10
Statistics of Live Stock and Fences,	47
Temperature,	353
State Fair of 1877, Character of Exhibit,	177
Pomological Society, Use of	80
Statement of Finances,	465
Stearns, J. N., on Marketing Fruits,	235
St. Joseph, Yellows at	402
Stoppage of Tile Drains,	62
Stout, Hon. Byron G., on the Apple Crop,	13
Address of Welcome,	11
Straight Rows,	398
Strawberry, the Red Alpine for Children,	377
Henderson's Plan of Growing the	173
Strawberries by Irrigation,	125
Which are Best of the Newer,	97
Success in Transplanting Depends upon What?	176
Sugars of Fruits,	151
Summer Care of Gardens,	414
Pruning,	21
Pruning Grape Vines,	384
Sun Blight, Protection from,	14
Sunken Garden Beds,	412
Supplementary Papers,	133
Suttle John, Resolutions in Memory of	199
Swindling Tree Agents,	401
Syringe for the Garden,	426

T.

Talman Sweet Apple,	380
Temperature for 1877,	462
Statistics of,	353
Thayer's, George W., Address of Welcome,	216
The Most Promising New Strawberries,	97
Age in which we Live,	100
Imported Cabbage Butterfly,	66
Mann Apple,	58
Thinning Apples,	85
Fruit,	407
Thomas, John, on Flower Borders,	53
Thompson, J. P., on Green Manuring,	107
the Work of our Society,	80
Timber Legislation,	10
Time for Picking Apples,	16
Pruning,	20
Transplanting,	170
Toads Good in the Garden,	436
Tobacco, use of, with House Plants,	12
Tomato Leaves, Singular Property of,	437
Top-Dressing Orchards,	377
Tracy, W. W., on Black-hearted Trees,	3

	PAGE.
Tracy, W. W., on Progress in Horticulture,	225
Training the Grape,	370, 373
Transformations of the Cabbage Butterfly,	68
Transplanting Peach Trees,	147
for the Farm, Orchard, and Garden,	168
Time for,	170
Is it Loss or Gain?	172
Garden Plants,	172
in Winter,	175
Fall and Spring,	394
Evergreens,	396
Transportation of Fruits,	6
Tree Roots in Tile,	362
Swindlers,	404
Trees and Shrubs for Ornament,	85
Trees, Where to get,	175
Advice about Buying,	231
for the Lawn,	361
Sanitary Use of,	442
Trip up St. Joe River,	402
Trunks of Trees, Protection of,	14
U.	
Use of the State Pomological Society,	80
Utility of an Education,	161
V.	
Value of Eastern Trees,	2
Fruit catalogue to Michigan,	29
Van Buren county, Report from,	209
Varieties, Do they Run Out,	104
of Peaches for market,	146
small Fruits for Profit,	356, 360
Running out,	374
Vegetable Garden, The,	427
Mould,	432
Vegetables for the Farm,	327
Verbenas as Annuals,	427
Vineyards, The Best in Michigan,	259
Vineyards at Monroe,	404
W.	
Walks and Drives, How to Make,	64
Wardian Cases,	223, 448
Water in Transplanting,	126
Horticulture	124
Watering Trees and Plants,	124
Wax Fruits, Value in Samples of,	10
Weeds,	433
Welcome Address at Pontiac,	11
at Annual Meeting,	216
at South Haven,	77
Whale Oil Soap for Red Spiders,	12
What is the Use of a State Pomological Society,	80
Where to experiment,	200
White-Leaved Plants,	453
Whittlesey's Experiment in Training Grape Vines,	370
Williams, M. B., on Growing Peaches for Market,	174
Winter Transplanting,	175
House Garden,	222, 446
Window Garden,	11
Y.	
Yellow Transparent Apple,	379
Yellows in the Peach,	364
at St. Joseph,	402

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